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LIBRARY OF CONGRESS, NOV 2 1914 SMITHSONIAN DEPOSIT.

Riter-Conley Manufacturing Company

STEEL CONSTRUCTION

Pittsburgh

THE UNITED GAS IMPROVEMENT COMPANY,

PHILADELPHIA.

—•—

BUILDERS OF

THE STANDARD DOUBLE SUPERHEATER

LOWE WATER GAS APPARATUS.

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ACCURATE MEASUREMENT

OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.

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THE AMERICAN
GAS LIGHT JOURNAL
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Presidential Address, American Gas Institute, October, 1914, by W. H. Cartley.

Among the duties that fall to the lot of your presiding officer not one is more agreeable than that of welcoming you to the Forty-second consecutive annual convention of the gas men of our country, a country still rich in the natural resources of our business, enjoying the advantages of peace, abundant products of the farm and field and factory, and a people well acquainted with the advantages of our product as a lighting and heating agent for domestic and industrial purposes. Fate has ordained that those countries whose people have shared with us in the building up of the technique and practical development of the gas business should now be engaged in a bitter and destructive conflict; and it becomes us, in a chastened spirit of humility and thankfulness, to extend to our contemporaries in those countries our sympathy; and particularly to the members of the Belgian Gas Association our extreme condolence that they find their country devastated, and its people wanderers because of a war in which they appear to have taken no initiative.

The Institute is now about to start its 10th year, and it has seemed to me worth while to occupy your time by a brief review of how the Institute has performed the duties contemplated for it by its founders. I should like, if time permitted, to read the address of the President of the Institute made at the first convention after the constitution was presented and adopted in its amended form. In his address he said: "It is not certain that our industry will profit from the change that we have wrought. We have destroyed three of the most useful organizations of practical and scientific men that have ever existed; we have abandoned the old simple form of organization, with the old unpretentious names; we are erecting a new and complex organization, with a name suggestive rather of confidence than of modesty."

He also said: "It is designed by the new constitution to effect what I understand to be the determination of the membership of this Institute, to continue and extend the technical work of the late gas associations, and further to so conduct the affairs of the Institute that it shall be, and be recognized as being, the authority in the United States on all questions relating to the manufacture, distribution and utilization of gas; including the keeping of accounts, and the relations between gas companies and consumers, and gas companies and the city and State. It is possible, by the exercise of care and deliberation to so place this Institute that it will be universally recognized as an authority to which appeals may be made, with confidence that scientific accuracy and perfect justice will characterize its decisions. The existing agitation on the subject of the public service utilities, their charges and service, and the variety of laws, regulations and standards proposed by the various States, indicate the importance of some recognized authority."

The constitution provides that the work shall be conducted under three general headings:

1. The work of the Public Relations Committee.
2. The work of the Technical Committee.
3. The co operation of research work and the cultivation of intimate working relations between the State Associations and the National Institute.

The work of the Public Relations Committee has been conducted in such a manner as to fulfill the purposes of the founders of the constitution. It has become a recognized authority. It has created confidence in its scientific accuracy. Throughout the history of the Institute the work of the Public Relations Committee in conferences with the Bureau of Standards, at Washington, investigations leading to the fixing of standards of quality; hearings before State Commissions; the reviewing of proposed regulations; the subject of workmen's compensation laws; and other laws affecting our business, is well known to many of you, although the modesty displayed in the reports of the Committee give but slight indication of the value of their activities.

The Technical Committee may well claim to have performed all the functions that were assigned to it by the constitution. The papers that are presented to the Institute, and which to a great number of the members constitute their most intimate association with the work of the Institute, are of a standard beyond adverse criticism. Our Proceedings constitute more than any other publication, American gas practice in every operation, except commercial work. The reports of the Institute's committees on special subjects constitute the final authority on these subjects.

This convention is the forum in which gas men meet for the presentation of ideas before a critical audience, and much might be said in detail of the far reaching effect that has been produced by the papers presented. I have in mind one comparatively simple, short, practical paper presented some 7 years ago, the author of which told me that no subsequent year has gone by since its publication that he has not received inquiries and discussions by mail from all parts of the country. The great principle involved in the presentation of these papers is co-operation, as opposed to a narrower spirit of self

interest. The President of the University of Wisconsin in an address last year, after expressing a realization of the fact that the success in destroying the great combinations known as "trusts" had not resulted in bringing about what was desired, e. g., reducing the price of the commodity supplied through open competition, said:

"Co operation is the cry of humanity in this Twentieth Century, and commerce should not be eliminated from sharing its great benefits. In our desire to retain legitimate competition. we should take care not to outlaw legitimate co-operation."

My earnest advice to every member of the Institute who desires to place himself on record as having carefully and systematically set down a full knowledge of some detail of the business, or who wishes to have his mind emerge from a hazy general conception and "rule of thumb" ideas on some subject, is for him to prepare a paper and submit it to the Technical Committee of the Institute. In no way can a man better master a subject. In no way can he better determine for himself and others the scope of his ability in connection with the business.

As to the third general purpose of the work of the Institute, in its relations to its affiliated State associations, it may be said, and too hastily said, that the result of the 9 years of operations has failed to carry out, except in a very small degree, the ideals of the founders of the Institute. Four State associations only have formally affiliated with the Institute, and the results of affiliation as outlined in the constitution have not been realized. It was intended that the Institute should confer with, and assign to the State associations some line of research to be carried on under the supervision of the Technical Committee of the Institute; and the State associations were to make certain agreements as to the limitation of qualifications for membership, among these, that each Association was to confine its membership to the district covered by it. It appears that from some unfortunate wording in the declaration of these purposes in the constitution, or by some unfortunate misconception of the purposes of the Institute, the local Associations have felt that the Institute was endeavoring to curtail their liberties, to direct their activities and to assume a control over their procedure that they are not willing to grant. And yet I am confident that there are men now before me, strong advocates of the usefulness of the local Associations, who are convinced that the work of the Institute has been of prime importance to the State associations and to the gas interests represented by them. Particularly do I refer to the work of the Public Relations Committee, who have been vigilant in watching the development of legislation and the trend of regulation by State Commissions in all portions of our country, whether or not represented by an affiliated association. It is my opinion that the idea expressed by the founders of the Institute in suggesting affiliation with the local associations will yet be found to be one of great importance; and I suggest that this matter be taken up now to determine exactly what can be done to bring about a closer bond between all of the associations. I have had the thought that there might be combined with the headquarters of the Institute, a department which could be called a "Bureau of Statistics," supported by contributions from the State associations, and to work in conjunction with the Public Relations Committee in doing that work which can be done, as I see it, by the Public Relations Committee of the Institute alone, namely, the furnishing to the State associations of data, information and arguments that have been presented to other State Commissions in solving the same problems. I do not intend to make the suggestion now because other provisions, looking to an even larger degree of usefulness in the relations of the Institute with the State associations, are under consideration.

The Institute represents the gas interests of the country and not the gas companies. The voting membership of the Institute is confined to individual members, employees of gas companies or of consulting experts in the gas business; each of whom must be competent to act as a manager of a department of a gas company and who must have his principal interest in the manufacture, distribution or sale of gas; and be over 26 years of age. This body of men is necessarily limited in the United States, but it is a body of men most keenly interested in the development of the business and best able to judge how the technique of the business shall develop. There is no Company Membership in the Institute. No company can vote, and no combination of companies control its affairs. The expense of carrying on the work of the Institute is met from the annual dues, initiation fees, and from the sale of its Proceedings, papers and publications.

Again, the Institute has not indulged itself in any campaign for new members in the modern sense of the word; the initiation fee has never been suspended and the dues are higher than those associations to which financial assistance is rendered through company membership. With no intention of making any unfavorable comparison with other organizations, nor to comment on their constitutional provisions, I hold that this spirit of independence that has been the marked characteristic of the American Gas Institute should be maintained to the end. Our business is to perfect ourselves through co-operation in all the knowledge that pertains to our trade, and to protect the gas interests by furnishing accurate information based on scientific and practical experience by which no Commission or other authorative body can be misled.

The Institute is solvent at the present time, but for the fiscal year ending August 31st, 1914, there has been a considerable depletion of its surplus, which has been reduced from a balance on hand August 31st, 1913, of $4,313.82, to a balance on hand August 31st, 1914, of $1,191.23. From time to time it is necessary to make considerable extra expenditures. The Institute is larger than ever before; is exercising an influence that is gradually increasing and it can scarcely be expected that the expenditures, if it is to fulfill its purposes, can be maintained without increase. Larger expenditures are now necessary if the Institute is to maintain its present dignified and useful character. The offices of the Institute are not adequate for the work that is being done; they are crowded, and a room should be provided for frequent committee meetings without upsetting the business of the office; and also accommodations should be made by which the Public Relations Committee may have an office for its Secretary, connected with the headquarters of the Institute, that would be sufficiently large to hold the committee's records and file the data and information necessary for the performance of the committee's duties. It should be an office that will give an impression of the dignity and force of the committee's work. This is urgently needed. The records of this committee should be a part of the records of the Institute, and not be contained in the offices of the members scattered through several cities.

It has been important that the Institute should associate itself with certain other organizations and contribute to carrying out purposes well defined and bearing on our trade. Among these are the International Commission on Illumination and the National Fire Protection Association, and such combinations as are represented by our Committee on Electrolysis.

At the time of the first report of the Public Relations Committee of the Institute in 1907, in which they stated: "That the change from the policy of open competition as a regulating force and secret accounting, to State Supervision and regulation with public accounting is not inimical to the interests of the owners of gas properties provided that it is accompanied by protection to the values of the properties supplying the public need. Such protection is as necessary to the public interest as to the corporations, since without it capital cannot be secured to make necessary extensions and improvements;" there were three States that had adopted State Commission control of public utilities. To-day 47 States and the District of Columbia have followed their predecessors and, with one exception, all the States in the Union have now State Commissions for the regulation of public utilities; of the e, 28 have authority to impose regulations on gas companies; 15 of the latter have published or adopted proposed rules, and 5 others are known to be formulating similar rules.

The result of this supervision by men of judicial minds whose business it is to become thoroughly acquainted with the operations of public utilities in order that justice shall be done to the public as well as to the capital invested in the companies, has developed several facts of interest. The first of these is that the gas companies, upon competent investigation on the part of the Commission, particularly after the Commission has become well informed of the state of the art of gas making with its marked peculiarities not encounted in and other public utility business, have been found to have very little to condem in the conduct of their business. If injury has been suffered by the public through the operation of other public utilities, the gas companies were found to have been conducting their business in an intelligent and careful manner, been maintaining good quality of gas and performing good service to their consumers.

Another fact is that the regulations of the Public Utility Commissions, as they have developed year after year, have strengthened the position assumed by many gas engineers that the quality of gas delivered to the consumer in the great majority of cities was not only extravagantly high, but that a lower quality of gas in many cases would have given better service. This statement, appearing to the untrained mind as an absurdity, upon careful investigation has been

proven to be correct. It has been held by engineers and experienced gas managers for some years that a gas of 570 heats units would, on the whole, for the numerous uses of gas, be more satisfactory than one of 600 heat units; but it was not until the last 2 years that any Public Utility Commission has felt itself secure enough in its position to set the standard so low.

A third and most important point has been made prominent. No country-wide general laws can be laid down regarding the quality that is at once applicable to every gas company's situation, but on the contrary the companies of each State must be examiped as to their own local conditions by an experienced commission. To attempt, for instance, to advise all State Commissions that some one standard of quality should be required of all gas companies is to court a loss of respect by State Commissions for the value of that source of advice. On the other hand, I believe that a State Commission should not yield to the temptation to impose more severe standards of quality on the more important gas companies within their control, and less severe on the smaller companies.

No Commission has yet adopted a photometric standard, but one has adopted a dual standard of calorimetric and photometric values; and this in Ohio is a peculiar case in which, owing to a large quantity of natural gas, they require 800 heat units for the natural gas, and 600 heat units and 12 candle power for artifical gas. All Commissions so far fixing standards of value for gas have agreed that the gas should be measured according to its heating value. And yet today there is more gas being made under candle power requirements than under heat unit requirements. The causes for this condition are diversified,—existing municipal laws, contracts, and inability to make changes quickly on the part of the gas companies under conditions peculiar to localities, and conflict of authority between State Commissions and municipalities are some of them. While each case must be decided on its merits, it is believed that the country at large is coming to a heat unit standard.

On the whole, and I say this with full realization that some members of the Institute will not endorse my statement, the operation of the gas business under the regulation, inspection and control of judicial bodies, well informed as to the art of gas manufacture, distribution and sale, giving an opportunity to show not only by argument but by inspections and tests the justice of their position and get decisions based thereon, is of advantage and would not willingly be changed by the gas companies. It has been helpful in taking the gas business out of the field of partisan interference and putting it on a stronger basis. Writers on economics now assert with confidence that public utilities, such as gas supply, are "natural monoplies." One Justice of the Supreme Court calls them "necessary monoplies," and the theory now meets with general acceptance that the supply of artificial gas in any district can best be conducted as a "natural monoply," subject to state regulation. While we are accustomed to this idea in this year, yet how venturesome we would have considered a president of a gas company ten years ago who dared, in the face of public sentiment, to maintain such an attitude.

The Wisconsin Commissions states that all public utilities should be operated under an "indeterminate franchise," or indeterminate permit," by which the public, either municipality or state, at certain times may purchase the plant and business under conditions which will secure to the company the right to appeal to the courts to get justice in the matter of value.

Perhaps, with fair dealing and open justice, a gas company would not be unwilling to be forced to sell to the municipality; and the idea of municipal operation is still attractive to many minds whose high degree of intellectural development is accompanied by a rather low standard of practical common sense. Without diverging into a discussion of this feature, it can be said that while the operation of utilities under State Commissions is generally believed to be as satisfactory an arrangement as has yet come within human purview, yet such objection to it as has so far appeared is due to the desire of municipalities to participate in the operation of utilities, without their limitations. The officers and some of the citizens of the municipality are, here and there, not content that in their dealings with public utilities they shall have a court of appeal provided, made up of men well informed and expert in the workings of the utilities, but, being one party to the contract, they desire also to have some of the authority to control the other side by coersion through local ordi nances or breach of contract—a most unfair proposition. Statistics show with such overwhelming force that the chances of success of municipally operated public utilities are less than those privately operated, that it would seem sufficient to convince the most sceptical; but the theory is an attractive one and will continue until some one is able to present the entire case in such a manner as to finally dispose of it. The last three Presidents of the United States have each declared their opposition to the governmental operation of interstate utilities.

The first Commissions, in issuing regulations and general supervision over the affairs of gas companies, no doubt felt their responsibilities resting heavily upon them. They were entering a new field of judicial procedure and were assuming executive functions, the practical effect of which was as uncertain to them as to the gas com-companies. The Wisconsin Commission issued its rules prior to 1907 requiring heating power standard, yet it was not until 1913, after an elaborate general investigation by the Engineers of the Gas Commission of the Second District of New York and the Empire State Gas and Electric Association, that it was known definitely by the gas men what difficulties and what possibilities of manufacture and distribution of gas lay in a heating power standard; and what is true of this one particular applies in general to all the relations between State Commissions and the gas companies. With 48 public utility commissions handing down decisions and rulings on all the intricacies pertaining to the business, the commissions are now, and will be more so, hedged about with the great mass of precedents and opinions affecting their decisions and rulings, and these will gradually partake of a closer adhesion to prior decisions. An opinion or announcement of some new principle, acceptable to both sides, influencing the future of our business, may appear through the dealings of the States Commissions with some other public utilities, and in our own work the manager of a gas company, while endeavoring to comply with the commission's rulings, will encounter such a mass of fine distinctions and apparent confusion of distinctions, that to any but the legal mind specializing in this work discouragement will follow bewilderment.

It becomes very desirable and necessary that these rulings and decisions of Commissions in their treatment of all public utilities shall be digested for us by competent legal authority, and presented in such a way that the decisions of all the State Commissions will be indexed and annotated so that we may have with each decision reference to other previous decisions on the same point. The preparations of such volumes is a matter of great importance and will require a considerable financial outlay. No decision by any State Commission can be trusted to be of merely local importance. The decisions of these Commissions must, if intelligently and fairly made, partake of much of the character of court decisions, established on the laws of the State and based on the powers of the Commissions, and modified by their previous rulings and those of other Commissions. The preparation of such a document would therefore be not only essential to the gas companies, but might become of assistance to the laws of precedents.

Steps have been taken to have published and distributed to subscribers from time to time a report and digest by competent legal authority, published in much the same way as the legal reports and digests now appear, *i. e.*, in bound volumns at regular periods and in small pamphlet form presenting the Commissions' rulings within a few days after they are rendered. I would ask your particular attention to this and the support of the Institute in carrying out this work, and I suggest that some action be taken by the Institute at this meeting looking to the cordial support by subscription of the publication of these volumes. In view of the large expense involved and realizing that the value of the publications is proportioned, almost, one might say as the Nth power of the ability of the reviewers of the decisions, it would appear that we should unite with the other public utilities interested to have this work done by the highest authority and in the most complete way in which it can be secured.

The program that will be presented at the sectional meetings is a sufficient guarantee that in giving up business to attend this convention you will be repaid by the information that can be acquired by attendance at the sectional meetings. In this connection I want to urge upon you the prompt and full attendance throughout the time that has been set for these meetings. I am not, personally, one of those who believe that the greatest benefit can accrue in attendance at these conventions by conferences on the outside during the sessions. Important as these are, and frequently of unusual value, yet they should not be allowed to keep a member away from the sectional meetings. It is due to the men who write the papers, to the officers, and particularly to the Technical Committee, that you should be in your place promptly at the opening of each session, and that you give full attendance to that portion of the work of the Institute which you alone can get at its full value.

Problems of Pressure Reduction and Regulation.

[Prepared by Mr. A. W. Cash for the Twenty-second Convention, Pacific Coast Gas Association.]

It is known to those who have given the matter any thought that the reduction in pressure of any fluid while flowing is caused by friction alone, and the only way to produce this friction is to force the fluid through some conduit, pipe or orifice at a velocity high enough to cause the required reduction or loss in pressure, the degree of velocity varying with the specific gravity of the fluid. If we assume that a fluid, such as gas, is caused to flow from a receptacle or pipe having a high pressure, through a small orifice in a thin diaphragm into a receptacle or pipe having a lower pressure, the reduction or loss of pressure will be directly proportional to the velocity through the orifice. If the high pressure remains the same with constant quantity being used from the low pressure side, the velocity through the orifice will be constant, and there will be a constant reduced pressure; if, however, the volume taken from the reduced pressure side is varied, the velocity through the orifice will vary, with a consequent change in the reduced pressure.

In the installation of automatic reducing and regulating valves, since neither the initial pressure nor the volume of delivery can remain constant under working conditions, it is necessary to provide some form of adjustable or controllable orifice, if the reduced pressure is to be kept constant regardless of the volume of delivery. Again, as friction losses in pressure of fluids flowing through pipes vary directly as the volume and the length of the pipe, it is necessary to provide pipes of sufficient size to transport the maximum required volume without serious loss in pressure; therefore in every case where any considerable reduction in pressure is required, the area of orifice necessary to pass the full capacity of the pipe will be many times smaller than area of the pipe required to handle the volume with the reduced pressure.

Although engineers' hand-books on steam, water, air, etc., are available with tables and formulas for proper sizes of pipes for conveying stated volumes of fluid for required distances, either as a result of incomplete and incorrect information or incorrect interpretation, pressure reducing valves are very generally installed in sizes entirely too large to give best service. If the various fluids handled commercially, and the pipes which convey them, were free from all foreign substances the large size of the valves would be of small importance; but unfortunately these foreign substances are an obstacle to proper reduction and regulation. As reduction in pressure is caused by friction, and friction is created by causing the fluid to flow at a sufficiently high velocity, it follows that to create a required amount of reduction in pressure, the fluid must pass through an orifice sufficiently restricted to create the required velocity. It may therefore be seen that the area of the orifice, and the velocity will be the same whether a proper size of valve was used, or one unnecessarily large. Under usual conditions the valve of proper size diameter of seat to accommodate the maximum flow with a small margin to spare, will open wide enough to pass the flow in a compact mass carrying with it any foreign substance; but a valve unnecessarily large in diameter, while having exactly the same actual area of opening, must necessarily supply it in a narrower and longer extended form, readily obstructed by foreign substance in the fluid. This condition may be extended to a point where lodgements of the foreign substance will prevent the closure of the valve when the volume of the outlet is materially diminished, thereby causing the reduced pressure to increase beyond the required point; or where the valve seat may be permanently injured, or damage result to other apparatus. These statements relative to size of valve and opening will be readily understood by reference to Fig. 1, showing a single seat globe valve. The diameter of seat in this illustration is about equal to nominal diameter of pipe, which is usual practice in globe valve construction, but would not be permissable in a reducing valve except under unusual conditions.

In illustration, we will assume that it is required to supply a 10″ line with gas at 8-ounce pressure, reduced from an initial pressure varying from 3 pounds to 50 pounds, 50,000 feet of gas per hour being taken from the 10″ main. A velocity of 15,000 feet of gas per minute would be necessary in the 10″ main, and to reduce from 3 pounds to 8 ounces delivery pressure, the gas will have to flow past the restricting valve seat at a velocity of approximately 85,000 per minute; so that a single seat valve having a seat 3″ in diameter and a lift of about 9/64 of an inch, would supply the gas required; and with higher initial pressure, the lift of the disc will be much less. If for the 3″ diameter seat opening, a valve with a 10″ opening be installed, the lift of the valve disc would be only about $\frac{3}{16}$ inch, which condition would render the valve extremely liable to obstruction and injury from particles of scale, cuttings, grit, or other foreign substances which might be in the pipe or carried in flotation by the gas. It is true, that in general, reducing valves supplied for service on main lines for gas, have a diameter of seat opening much smaller than the diameter of the pipe in which they are to be installed, but this advantage is largely offset by the fact that they have practically all been of the double seat, or balanced type, which open only $\frac{1}{4}$ the distance of the single seat of equal size.

It is generally well known that the obtainable volume of fluid through a pipe of given size will vary as the density of the fluid. For example, manufactured illuminating gas being 30 to 35 per cent. lighter than air, a pipe will convey 30 to 35 per cent greater volume of gas than of air, and it will likewise convey a greater volume of air than steam, and a greater volume of steam than of water. Yet in a general way, it has been found that the same proportional sizes of pressure reducing valves apply on pipes for conveying the different fluids with some modification on account of materials permissible for use with the fluids.

The writer's advocacy of single seat reducing and regulating valves especially in gas service, is, he belives, fully confirmed by reference to cuts of the regulators made by several of the better known manufacturers in this line. Fig. 2 is the well-known Reynolds service

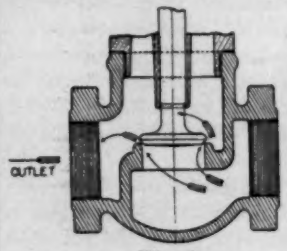

Fig. 1.

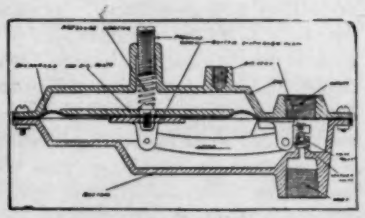

Fig. 2.

regulator in which the $\frac{3}{4}$″ size has a $\frac{3}{16}$″ diameter seat opening, and is suitable for initial pressure varying from 3 pounds to 20 pounds, with a $2\frac{1}{2}$″ to 6″ water column delivery pressure, and a volume of delivery as great as 250 feet of gas per hour. Fig. 3 is the Gas Machinery Company's service regulator, which has about the same relative proportions of pipe connections, seat opening, and general construction as the Reynolds, and about the same capacity. Fig. 4 illustrates the

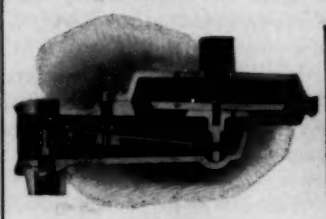

Fig. 3.

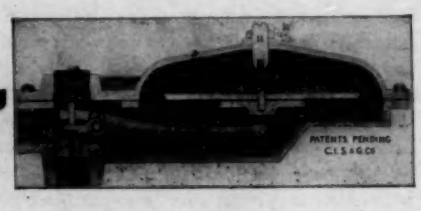

Fig. 4.

Connelly Iron Sponge and Governor Company's service regulator, having also the same general proportions of pipe connection and seat opening. Fig. 5 shows the Sprague Meter Company service regulator. Fig. 6 is Mueller direct operating metal diaphragm service regulator.

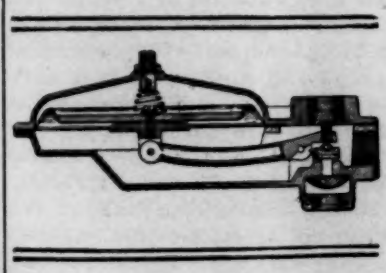

Fig. 5.

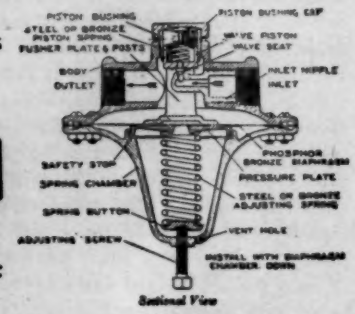

Fig. 6.

All of these regulators have a seat opening equal in area to $\frac{1}{8}$ of the $\frac{1}{4}$″ pipe on which they are to be used, and careful measurements by the writer, under actual working condition on three of these makes show that with the initial pressure as low as 3 pounds, and with the

full volume of delivery at 3″ water column, the seat disc had a lift of only one-half its full capacity or about $\frac{1}{32}$ the area of a ¼ pipe. As 200 feet of gas per hour flowing through the ¼″ pipe would be at velo city of about 1152 feet per minute, in order for that amount to come through the seat opening of $\frac{1}{32}$ the capacity, it must flow at a velocity of about 36,864 feet per minute. With a consumption of 250 feet per hour, the velocity through the regulator seat would be about 44,236 feet per minute, and with an initial pressure of 15 pounds, the actual velocity through the seat would be over 85,000 per minute, and with higher initial pressures the seat velocity would be correspondingly greater. From this it may be seen that with very high initial pres sures the diameter of seat opening must be decreased, or else the lift of the valve disc would be so slight, that it would be quite easily obstructed by foreign substances which could not be kept out by a screen of practical fineness.

In large size regulators of the double seat type, and diaphragm and lever construction, even where the seats are of the proper proportion for the amount of reduction to be made, another difficulty is often presented; naphthalene, and substances of a tarry nature coat the inside of the regulator, in the seat openings, and on the seating portion of the valve disc; and clog and obstruct the free operation of the moving parts, and cause a considerable change in the delivery pressure, or prevent complete closure when no gas is being used, thereby causing a dangerous increase in delivery pressure before the evenly balanced diaphragm structure has enough power to crush the substance lodged or coated on the valve seats.

The writer's experience covering more than 20 years in the design, manufacture and installation of pressure reducing and regulating valves in various kinds of service, has lead to the single seat valve as the proper solution of the pressure reducing and regulating valve problem for all kinds of services, and all sizes of valves; and while his experience in the design and manufacture of valves for gas service has been only a little over three years, it thus far has not shown that they require a construction materially different from those used in other lines of service. He is convinced that the most positive and accurate regulating valve in the market to-day is equally well adapted for service on cold water, hot water, steam, air, gas and oil, requiring only slightly varying proportions of its several operating parts together with seat materials adapted to the several kinds of service. For larger sizes the well-known double seat and counter balanced diaphragm types operate quite satisfactorily, on gas or other fluids entirely free from foreign substances; but as such conditions do not prevail in ordinary commercial installations, the obvious alternative is to resort to construction which will have the least liability to obstruction, and will utilize any excess of initial pressure for power to open or close the regulating valve in accordance with a very slight change in the delivery pressure, which slight changes in delivery pressure would be caused by the increased or diminished volumn used from the delivery line. With a valve thus constructed installed on a line with an initial pressure of, say, 25 pounds, and a delivery pressure of 8 ounces, there would be an available pressure of 24½ pounds, multiplied by the effective area of a suitable size diaphragm (say 25 square inches) giving a total acting force of 612½ pounds to move the operating valve when necessary, with a change in the delivery pressure as small as $\frac{1}{16}$ of an inch water column; whereas the same amount of change in delivery pressure, if acting on a counter balanced diaphragm having 25 square inches effective area would produce only about $\frac{1}{16}$ of a pound actual available force to operate the valve. The 612½ pounds would be ample force to overcome considerable friction or obstruction, and properly close the valve; while the $\frac{1}{16}$ actual force might be enough to move a well balanced clean valve, but if any appreciable friction or obstruction were present, it would be inadequate.

On account of extremely small available force supplied by the counter balanced diaphragm for operation of the controlling valve, several manufacturers have turned to forms of construction in which the power stored in the excess initial pressure is utilized to open or close the restricting valve disc; an auxiliary or pilot valve being used to control a small opening or passageway through which a portion of the initial pressure is conveyed to a piston, or large diaphragm, which in turn controls the main valve. The auxiliary valve generally has a comparitively small seat opening, and seat disc controlled by a small diaphragm, connected with and controlled by the delivery pressure. Generally the auxiliary valve and the piston, or large diaphragm, which operates the main valve, are all contained within the single valve structure or casing, which necessarily makes complex construction, quite readily and seriously effected by variable temperatures, and by various elements and foreign substances in the fluids.

In regulating valves having a piston controlled seat disc, the necessarily close fitting piston is quite seriously affected by uneven temperatures, and by corrosion of the metalic surfaces in contact, as well as by a coating of the surfaces by foreign substances. Summarizing the various weak and troublesome features of the existing types of reducing valves, the writer offers as a solution of the problem the following suggestions: Use an ordinary globe valve body, with a single seat of proper size. Make the seat disc and stem in one piece, or so connected with the stem projecting through a stuffing box with a flattened or squared portion for a wrench, that the seat may be rotated on the seat to regrind, or clear away foreign matter. An outside mounted large diaphragm and diaphragm chamber, superimposed on the valve bonnet, which also carries the stuffing box and stem, a pressure plate mounted on end of stem, to receive and support the diaphragm and transmit the force of the initial or high pressure acting on opposite side of diaphragm to the stem and valve disc. The auxiliary valve to be an independent unit of the diaphragm type, connected to the main regulator by small brass pipes in such a manner as to use the full initial pressure, acting on the large diaphragm to close the main valve disc in accordance with the delivery pressure; the auxiliary valve in turn controlled entirely by the delivery pressure. Make seat contact surfaces, both in main valve body and on valve disc, very narrow, and of a hard bronze or other non-corroding material, wherever the main valve is not required to shut absolutely tight, or where a very high initial pressure is to be reduced to a very low delivery pressure. For comparatively low initial pressure, and where the regulator must shut off completely at times, use a hard non-corrodable metal seat in the body, and a softer seat in the valve disc, of volcabeston, leather, or other suitable material. The construction of the auxiliary valve and its connection to the main regulator must be such that the seat of auxiliary valve may be readily cleaned and renewed in two to three minutes, without necessity of shutting off gas through main regulators, a valve on the main line or on a bypass being used to control the delivery pressure while auxiliary valve is being repaired.

Snow Removal by Melting.

This subject is of importance to the larger cities, and one that should interest our engineers of utilization. The following is from an article by Mr. S. Whinery in *Engineering News*, who recommends heated water as the melting medium. Mr. Whinery says the opinion is quite general that, while theoretically it should be possible to melt snow on the streets by artificial heat at a reasonable cost, it is impracticable and uneconomical in actual practice. Such experiments as have been made seem to confirm this conclusion. But the thoughtful inquirer is likely to reason that where a process appears to be practicable and economical in theory, failure to secure satisfactory results in practice may be due to a lack of knowledge or skill in applying it, and that the subject may be worth further investigation. The fact that, in burning, 1 pound of coal gives off sufficient heat to melt from 70 to 90 pounds of snow, looks attractive at first thought to one who is not familiar with the difficulties of converting heat into useful work. Many devices for disposing of snow by melting have been proposed and a number of them tried, only to prove failures because the basic scientific principles involved and their practical application were unknown or disregarded by the inventors.

I will describe for illustration a project for melting snow by the application of water from the fire-hydrants, heated to a temperature just below the boiling point in an ordinary steam boiler and applied to the snow on the street by means of a hose and nozzle.

Assume that a standard 60-horse power portable boiler is used capable of evaporating 30 pounds of water per horse power hour, from a feed-water temperature of 100° F. to steam at a gage pressure of 70 pounds, equivalent to about 29½ pounds from a feed-water temperature of 50° F. The quantity of water evaporated in an 8-hour day would be $29.5 \times 60 \times 8 = 14{,}160$ pounds. To convert 1 pound of water into steam under the conditions named, requires, we know, the absorption of about 1,165 B. T. U.'s and the quantity of heat necessary to so convert 14,160 pounds of water is

$$14{,}160 \times 1{,}165 = 16{,}496{,}400 \text{ B. T. U.'s.}$$

The quantity of heat required to melt 1 pound of snow from a temperature of 20° F. is:

	B. T. U.'s.
To raise the temparature to 32°	12
Heat absorbed in fusion	142
Total	154

If the snow weighs 8½ pounds per cubic feet, the net quantity of heat required to melt 1 cubic foot of snow would be:

$$154 \times 8\tfrac{1}{2} = 1{,}283 \text{ B. T. U.'s.}$$

But a part of the heat contained in the hot water would be lost in passing through the discharge hose, and in its application to the snow. If we assume that only two thirds of the heat leaving the boiler could be made actually available for melting snow then the gross quantity of heat necessary to melt 1 cubic foot of snow would be 1,925 B. T. U.'s, and the 8 hour product of heat from the boiler should melt

$$\frac{16{,}496{,}400}{1{,}925} = 8{,}469 \text{ cubic feet} = 317 \text{ cubic yards of snow.}$$

To heat 1 pound of water from 50° F. (the assumed temperature of the hydrant water) up to a temperature of 210° requires 210° — 50° = 160 B. T. U.'s, and since the boiler is capable of developing 16,496,400 B. T. U.'s per 8-hour day, the quantity of water so heated would be;

$$\frac{16{,}496{,}400}{160} = 103{,}102 \text{ pounds} = 12{,}363 \text{ gallons.}$$

What would be the cost?

We may safely estimate that in a portable locomotive-type boiler of 60-horse power capacity, 1 pound of anthracite coal would evaporate 6 pounds of water, and as the evaporating capacity of the boiler is 14,160 pounds per 8-hour day, the quantity of coal required would be

$$\frac{14{,}160}{6} = 2{,}360 \text{ pounds} = 1.18 \text{ tons.}$$

The complete plant necessary would be the portable boiler equipped with a gasoline engine to propel it on the street, sufficient hose to connect the boiler to a fire-hydrant, and a short discharge hose and nozzle.

As the pressure would be that in the water mains only, a cheap second-hand boiler could be used, and condemned fire hose would answer the purpose. The cost of the plant would probably not exceed:

One second-hand 60-horse power portable boiler	$750.00
Hose, nozzle and connections	300.00
Gasoline engine attached to boiler truck	250 00
Total	$1,300.00

The "fixed" charges on the plant would be:

Interest, depreciation and repairs, say 12½ per cent	$162.50
Storage through summer season, say	15.00
Total	$177.50
If we assume that the plant could be used only 48 hours per year = six 8 hour days, these fixed charges would amount to per day	29.58

The total operating expenses per day would be about:

Fixed charges	$29.58
1.2 tons coal delivered at $5.50	6.60
One fireman and engineer	3.00
One hoseman	3.00
One helper	2.50
Miscellaneous	2.00
Total	$46.68
And if 317 cubic yards of snow were melted, the cost per cubic yard would be	14.73c
To cover contingencies, add 10 per cent	1.47c
Total per cubic yard	16.20c

The cost of hydrant water used is not charged in the account; in cities, like New York, having an abundant gravity supply during the winter season this item may be neglected.

The above statements and figures seem to be conservative on the side of safety, and, if so, the result ought to be attainable in practice. The figures seem sufficiently promising to warrant a fair trial of the project under working conditions.

We have, in the above, figured on melting all the snow on the street. It is probable, however, that more or less unmelted, or partly melted snow would be carried into the sewers with the current of water, thus tending to reduce the cost.

Recent experience in New York city seems to favor the method of diaposing of snow by collecting and forcing it into the sewer-inlets and manholes by the use a jet of cold hydrant water. By the hot water method, no handling of the snow would be necessary. It would be melted as it lies on the street, and the resulting water would flow into the sewer inlets. There would probably be no question of the capacity of the sewers to handle all the water produced.

It is not intended to here discuss the probable merits or demerits of artificial snow melting, nor the practical difficulties and objections to be encountered. The purpose is only to outline the technical problems involved, for the use of practical men or inventors who may wish to give the matter further consideration.

The hot water project was taken for illustration not only because it includes most of the technical elements involved, but because water is a good absorbent and conveyor of heat, and by its rapid penetration into the snow should transmit its heat to the snow with comparatively little loss. The plant used for illustration is crude, for it is to be remembered that in steam boilers only from 50 to 80 per cent of the heat yielded by the fuel is actually taken up by the water. It is quite possible that a more efficient type of heater for the purpose could be devised.

At first thought, it would seem that a project for the application of the heat from the coal directly to the snow would be more economical and less complicated, but as this seems to involve the application of the heat to the surface only of the snow, the heat losses would be much greater than from the penetrating hot water.

Safety First.

[Read by C. A. Luckenbach before the Twenty-second Convention, Pacific Coast Gas Association.]

So much has been written and spoken in the last few years on "Safety First" that one who takes up the question is very liable to lay himself open to the charge of plagiarism. In presenting this the writer desires to be understood as making no claim to originality but rather of re-presenting those ideas which strike at the root of the matter, and which must be carried out in order to make the work successful.

The question propounded by the murderer Cain in the biblical times: "Am I my brother's keeper" is no longer debatable. The answer is: "I am my brother's keeper."

Whether actuated by mercenary motives or humanitarian instinct, the fact remains that most positive and effective compliance with this principle has been made by those least vitally interested.

While for a long time manufacturers have been working along the lines of protecting employees from accident and injury, perhaps without any motive except a mercenary one, because they realized that sooner or later the law would compel them to do so; the employee himself who from all points of view is the one vitally interested, has directed his efforts and energies toward securing the enactment of workmen's compensation laws, factory inspection and compulsory installation of safety devices, etc., and has, to a great extent, lost sight of the fundamental principle involved—that in the end the safety of the individual depends, to a great degree, upon the individual effort he makes to secure his own and his fellow workmen's safety. Statistics show that less than one-third of industrial accidents can be attributed to faulty machinery, and that the balance must be laid to the carelessness of the injured one or of some fellow-worker.

Ask an employee of a manufacturing concern what is being done in his plant to better safety conditions; and his answer will, in all probability, be: "*They* are doing all they can," or "Our Union is forcing them to better conditions," and the like. But seldom, if ever, do we receive for a reply: "We are *all* working to bring this movement to its highest point of perfection," or "We are working shoulder to shoulder with the boss." The average employee has his mind fixed upon the theory that the enactment of law, and the interest of the owners, officers and superintendents in his well-being is sufficient protection for his family and himself. He looks with disfavor, and expresses open protest upon any action which he feels infringes his personal liberty, and resents interference with his so-called individual rights; yet he expects his employer to make his condition safe and provide for him and his, without co-operation upon his part.

Some years ago at a steel works in Pennsylvania, a number of serious accidents occurred in the machine shops, directly traceable to the wearing of a beard by the injured employees. An order was issued that the men in the shops must remove their beards, and that no one would be employed after a given date who wore a beard. A strike was at once declared, and for a considerable time, the entire works were tied up because the men would not permit their personal rights to be controlled by the company. The right to wear hair on the face, not the actual wearing, was more important to these men than the life of a fellow employee, more than the sorrow or suffering of the widow and orphaned children. Do not misunderstand my meaning. I do not believe this lack of co-operation is due to any inherent feeling of antagonism, but rather to a lack of thought, or of education; a lack of proper understanding upon the part of the employee. So far as the employer is concerned the time has passed, even for those who might desire, to discuss the advisability or the justice of workmen's compensation laws. These laws have come to stay and legislation is not going to stop here. On the contrary already agitation is abroad for a minimum wage law, legal maximum hours for work days, old age pensions, sickness insurance, and occupational disease laws; and some, if not all of these, are bound to come. Notwithstanding the yellow journals and the kept periodicals of jayhawkers and political agitators, it is my firm conviction that the average manufacturing employer is his employee's best friend, and is not only willing to assist but also to lead in any equitable movement for the physical, material and educational advancement of his workmen. The employer knows that unjust and arbitrary legislation in this direction is bound to react upon those whom it is intended to benefit, and is willing to accept criticism of his misconstrued motives, rather than permit unprotested action, which he knows in the end must lead to the injury of those who he would assist.

Some years ago, in a manufacturing plant in this state, the officers had under discussiou a tentative retirement system covering incapacitated employees who had served a given number of years, upon a pension, based on a fixed percentage of the average wage received during the last ten years of service. While this plan was under consideration an old employee became so incapacitated that his retirement was necessary. When the matter was presented to the executive head of the organization with a statement of the pension the retiring employee would be entitled to under the pension system, and authorization asked for its payment, this reply was made: "This man cannot live decently upon such an amount," and the amount authorized was practically double. It was given willingly and cheerfully, and until the man's death, yet all knew that the legal compulsory payment of any such sum would have been vigorously resisted, and with the greatest justice and equity.

If unjust laws are enacted, or compensations provided are too high, the result will be the enactment and enforcement of most stringent rules for the protection of employer and employee, and the removal of many employees whose age, physical condition, carelessness, thoughtlessness, or inefficiency makes their risk above normal In a word, the injustice of law will largely correct itself and will be but a temporary matter.

The wise and far-seeing employer, and the majority are such or they would not be employers, has, can and will, install accident preventive devices, not only because it is cheaper and wiser so to do, but also because of human instincts which, in a measure at least, control him. But, as before stated, this will remove but one-third the trouble, the other two-thirds lies with the employee himself. Safety devices are of great benefit, but before the greatest purpose can be accomplished there is a far more difficult task, that of making the men think; of making them apply their minds wholly to the task at hand; of dividing the day into work hours, play hours and rest hours, and confine themselves to such division, not mixing the hours indiscriminatingly; to look upon the enforced following of such lines of action, not as an infringement of their personal liberties, but as an effort for their well-being. This is not easy but it must be accomplished if the movement is to have the highest degree of success.

In other words, the success of the "Safety First" movement will never be brought about by the employer alone. He must have the co-operation of all employees. There must be team work. One of our prominent public men has said:

"I have never seen any way of accomplishing any important result in this world except by team work. Politics, base ball, foot ball and church work are all the same in this regard. A man takes himself too seriously who thinks he can accomplish much by himself."

In this team work the employer must lead and get next to the men; must remove from their minds the idea that this action is based upon selfish motives; must awaken them to the dangers which surround them and the necessity of caring for themselves.

All men are more or less prone to carelessness, and with those working around machinery and in dangerous places the spirit of bravado and recklessnes seems to be particularly marked. The workman seem to think that a miss is as good as a mile, that "Steve Brodie took a cnance" and so will he. He forgets where Steve Brodie now is and where he may be if he takes a chance once too often. At the same time this man, under the mask of apparent indifference, has a warm and tender heart. His eyes fill with tears when he recites the sufferings of his fellow worker, and his pocket-book is open, often to his own financial detriment, in providing funds for the unfortunate fellow employee. He has a heart, a conscience, a desire to do the right thing, but it lies dormant to a large extent and needs awakening; and those at the head must lead in the movement to bring this awakening.

The writer believes that the first and essential steps in this direction is to "get next" to the men. Mark my words, get next to the "man" not the "employee," for when you get next to the first you are next to the other. By "getting next" I do not mean any action which involves breaking down discipline and creating license. I mean that course of action which bring a realization to the employee that discipline is a necessary adjunct of successful business, and not an evidence of a determination to show that "might makes right." I mean the creation of that feeling which makes a man cheerfully comply with instructions rather than be forced to give obedience to rules. Argue as you may, the only way to get next to the man is through the social side of his nature. Why not start "getting next" to the man by having periodical picnics and social rallies for him and his family, meetings at which business is entirely tabooed and sociability alone prevails? Let the entertainment consist of dancing, moving pictures, a musical entertainer or two, and light inexpensive refreshments. By all means have the men co-operate in arranging the rallies, and have the foremen, superintendents and managers attend and join in the spirit of the occasion. Following a meeting or two of this kind to "thaw the ice" we are ready to begin an effective safety campaign, and to organize the working forces into living, active co-operation.

The Wisconsin Industrial Commission recommends the following plan of organization, which has been adopted in many plants:

First.—A central committee composed of the superintendent, as chairman, and three or more of the more intelligent foremen.

Second.—A safety inspector who acts as secretary of this committee and attends to all details.

Third.—Weekly inspection by each foreman with report to the central committee.

Fourth.—Monthly meeting of the foremen and superintendent to discuss accidents and to exchange suggestions.

Fifth.—An inspection committee in each department, to be appointed from the workmen. Each committee to make a weekly inspection and send written report to the foreman. This committee also investigates serious accidents.

Sixth.—Careful instruction to every new man in regard to the hazard of his employment and also in regard to the work that is being done by the officers and the men for safety.

Where a manufacturing concern has several works or distinct plants, such as a company operating both gas and electric plants, and distinct departments such as manufacturing and distribution, under a separate superintendent, or where several plants of the same kind are located at different points, there should be an additional committee, composed of the superintendent of each works, plant and distinct department, with the manager as chairman to further supervise the work. The meeting times of the different committees should be fixed and definite and not irregular.

In plants where a safety inspector could not find constant occupation these duties could be assigned to some reliable employee whose first duty is safety inspection. Possibly rotation among the men in committee work, selecting from time to time those who show the most interest in the work, as a mark of reward and honor, is advisable. As a means of stirring men to action, the head of a safety campaign in the east continually uses the following language:

"You are expected to go out and find things that are wrong. Understand that it is the wrong things you've got to keep your eyes

(*Continued on page* 282.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, NOVEMBER 2, 1914.

[Official Notice.]

New Jersey State Gas Association.

Broad and Bank Streets,
Newark, New Jersey,
October 15, 1914.

In connection with the meeting of the New Jersey State Gas Association, to be held in the office of the Public Service Gas Company, Trenton, New Jersey, on Thursday, November 5th, 1914, the following program has been arranged:

"Indirect Indoor Lighting," by Mr. James P. Hanlan, of the Public Service Gas Company, Newark, N. J.

"Indirect Outdoor Lighting," by Mr. Jacob B. Jones, of the Bridgeton Gas Light Company, Bridgeton, N. J.

"Fuel," by Mr. Stanley Grady, of the Roberts & Mander Stove Company, Philadelphia, Pa.

"Heating," by Mr. William H. Schofield, of the Sanitary Heating Company, Brooklyn N. Y.

The above subjects will come under the general head of "Specialization of Effort," which we trust will prove interesting and beneficial to our members and guests. O. F. Potter, Secretary.

BRIEFLY TOLD.

Gas Exhibit at the Panama-Pacific International Exposition, San Francisco, 1915.—President E. C. Jones, of the American Gas Institute, sends us this under date of October 29:

At the recent meeting of the Institute, in New York, there were evidence of a growing enthusiasm in the matter of having the gas business adequately represented by an exhibit at the World's Fair in San Francisco. At the request of the newly elected President the following agreed to serve as a committee and work for a successful gas exhibit:

E. G. Cowdery, Chairman,	W. A. Baehr,
J. M. Morehead, Secretary,	T. D. Miller,
Paul Doty,	O. O. Thwing,
P. N. Guldlin,	E. C. Jones (*ex-officio*).

The committee, immediately after organization, proceeded to interview the leading manufacturers of gas appliances, and met ready and encouraging response and application for space. So much enthusiasm was evinced that the committee telegraphed to the Panama Pacific International Exposition Company, at San Francisco, for a reservation of space in the Palace of Manufactures, and received a favorable response. This movement deserves the support of every manufacturer and contributor to the manufacture, distribution and uses of gas; and a creditable exhibit on the part of those at all interested in the future of gas will be a sign of real life. Not to exhibit would be equivalent to a gas man closing the outlet valve of the storage holder and expecting to do business. The Panama-Pacific International Exposition will be the key to the market of the world.

Illuminating Engineering Society, Council Meeting.—The first 1914–1915 Council Meeting was on October 8, at the general offices, 29 West 39th street, New York, with Messrs. C. O. Bond, H. Calvert, Joseph D. Israel, C. A. Littlefield, L. B. Marks, A. S. McAllister, President; Preston S. Millar, J. Arnold Norcross, C. J. Russell and G. H. Stickney in attendance.

The minutes of the June meeting as read were adopted. A report of the Council Executive Committee giving a summary of its activities during the summer months was read and approved, and it was voted that a resolution of thanks be sent to the chairman of each committee for services rendered during the preceding administration.

A draft of the annual report of the Council to the Society was presented for approval.

Twelve applicants were elected members of the Society.

The resignation of Mr. Joseph D. Israel, as general secretary, was accepted with regret and a vote of thanks extended him for his services to the society.

Mr. C. A. Littlefield was appointed general secretary to succeed Mr. Israel; and the latter was named a director to succeed Mr. Littlefield, resigned.

Mr. V. R. Lansingh's resignation as a director of the Society was accepted, and a special committee drafted resolutions expressive of regret at his severing his connection with the board and of appreciation of the work he had done.

The following appointments were confirmed:

Committee on Nomenclature and Standards.

A. E. Kennelly, Chairman,	C. O. Bond,
C. M. Shapp,	S. E. Doane,
Louis Bell,	A. S. Miller,
E. P. Hyde,	C. O. Mailloux.
E. B. Rosa,	

Lighting Legislation Committee.

L. B. Marks, Chairman.	Clarence L. Law,
O. H. Basquin,	F. J. Miller,
C. E. Clewell,	G. H. Stickney.
Oscar H. Fogg,	L. H. Tanzer,
Herbert E. Ives,	W. H. Tolman.

Papers Committee.

G. H. Stickney, Chairman.	C. E. Stephens,
C. S. Barrows,	E. J. Edwards,
R. B. Ely,	M, G. Lloyd,
Norman Macdonald.	

Committee on Glare.

P. G. Nutting, Chairman,	J. R. Gravath,
M. Luckiosh,	F. H. Gilpin,
F. A. Vaughn,	F. K. Richtmyer,
Nelson M. Black.	

Committee on Editing and Publication.

C. H. Sharp, Chairman,	M. G. Lloyd,
Norman Macbeth.	

Advertising Committee.

M. Turpin, Chairman,	F. H. Gale,
F. J. Rutledge,	J. C. McQuiston,
J. Robert Crouss,	R. F. Pierce,
B. J. Fisher, Jr.,	Joseph D. Israel.

Sustainining Membership Committee.

Preston S. Millar, Chairman,	W. M. Skiff,
W. H. Gartley,	R. F. Pierce,
B. McFarland Moore,	E. W. Lloyd.

Committee on Reciprocal Relations with Other Societies.

W. J. Serrill, Chairman	C. J. Russell,
Bassett Jones,	Stephen A. Thomas,
G. J. Mundo,	Frank E. Wallis.

Board of Examiners.

W. Cullen Morris, Chairman, Bassett Jones, Jr.

Exhibition Booth Committee (Gas).

Oscar H. Fogg, Chairman, G. S. Barrows.
W. F. Little,

Exhibition Booth Committee (Electric).

Ward Harrison, Chairman, N. H. Boynton,
C. W. Bettcher, W. F. Little.

Finance Committee.

A. Hertz, Chairman, J. Arnold Norcross.
Joseph D. Israel,

NEW ENGLAND SECTION, NATIONAL COMMERCIAL GAS ASSOCIATION.—At the last meeting of the New England Section, N. C. G. A., these officers were elected for the current year:

President, J. L. Tudbury, Salem, Mass.

Vice-President, L. C. Swan, Lawrence, Mass.

Secretary-Treasurer, C. J. Connell, Boston, Mass.

Directors—H. K. Morrison, Lynn Gas and Elec. Co.; A. F. Pettingill, Cambridge Gas Co.; J. C. Aaron, Manchester Gas Co.; F. M. Roberts, Haverhill Gas Co.; J. A Langelier, Nashua, N. H.; B. J. Bean, Natick, Mass.; R. A. Fancy, Newton and Watertown Gas Light Co.; G. P. Smith, Jr., Old Colony Gas Co.; F. K. Wells, Pittsburgh Water Heater Co.; W. B. Nichols, Citizens Gas Light Co., Quincy; A. A. Higgins, Providence Gas Co.; E. B. Mooney, Brockton Gas Co.; E. F. Ripley, Welsbach Co. of New England; Thomas Thomas, Boston Consolidated Gas Co.; A. H. Vegkley, Boston Consolidated Gas Co.: M. E. Abbott, Glenwood Stove Co.

NEW YORK SECTION "GAS MEETERS."—The October dinner of the New York "Meeters" was on the evening of the 21st, at the Hotel McAlpin, with about 90 in attendance. The dining room was set with round tables accommodating 8 persons, with a raised speakers' table on one side of the room, and a small stage for the entertainers opposite. Mr. P. S. Young, President of the National Commercial Gas Association, was the guest of the evening and the principal speaker. Others who spoke were Chairman Bartlett, of the Philadelphia Section; C. M. Cohn, Vice-President of the Consolidated Gas, Electric Light and Power Company of Baltimore; Colonel George D. Roper, Judge Rice, J. D. Taylor, J. M. Brock and W. S. Guitteau. Four vaudeville artists contributed songs and dancing during the evening. Mr. Brock, for the Entertainment Committee, reported that $101.65 was realized from the theatre party on the 7th of October; and that the entertainment feature for the November dinner would be something entirely novel, being arranged by the Sporting Editor of the New York Times.

A flash-light picture of the diners was taken just after they sat down; and the few dress suits present, because some attended the reception to the President of the American Gas Institute after the dinner, added to the dignified appearance, but did not interfere with all having a good time.

TWO VIEWS OF "GOING VALUE."—At the convention of the Indiana Electric Light Association, in Indianapolis, two public service commissioners expressed their views on "going value."

Characterizing it as a storm center of modern business, the Hon. Halford Erickson, of the Wisconsin Railroad Commission, defined this intangible asset as the sacrifice borne by an enterprise in constructing or building up a successful business. Among other sacrificial charges which must be borne are discount on bonds acquired in getting capital for plants, etc. These are in the nature of interest charges and must be considered in appraisal. A few per cent. must often be allowed for organization, legal expense and the like in appraising utilities, but where law suits have been numerous and of long duration, this account may grow beyond a few per cent. and should be taken into consideration by every fair appraiser. Considering the position of the courts on "going value," the speaker said that in all selling cases it had been recognized, but in rate making many people seem to think "going value" ought not to be considered. The courts, however, have allowed it in the case of the Columbus (O.) Railway and Light Company and others. "Going value" should not only be allowed when found, but should be accurately determined in each case, the amount of "going value" to be allowed being based upon the development charges borne during the unremunerative period. The speaker said further that he favors charging "going value" to the capital account, as it is in the nature of an investment. How much should be allowed is a question of judgment to be fixed after a thorough investigation by an honest and competent regulating body.

Judge Thomas C. Duncan, chairman of the Indiana Public Service Commission, declared that rates must be fair to both the public utilities and the people. If a company has had a fair return from the start, and in later years has had more than a fair return, then the public has borne the expense of "going value" and it should not be allowed in making an appraisal. This makes it necessary for a commission to know the entire life history of every plant, and for this reason the Indiana commission is making a complete study of every plant before designating a rate.

Speaking of the hearings before the Indiana commission, Judge Duncan said that reputable expert witnesses have testified that after all possible expense had been provided for, a profit of from 10 to 15 per cent. should be allowed. This rate, he considered, too high to be countenanced by the public, as it is more than a farmer or ordinary business man is able to secure from his endeavors. Regulation, he said, should above all things be fair, as it is probably the last experiment the state will try before going to state or municipal ownership. The plan of the Indiana commission is, as far as can be done with equity, to take care of the small user: that is, the customer whose bill of $1 a month might be a burden. In closing, the speaker dwelt upon the difficulties of meeting condemnation of the public and the utilities in a judicial attitude and asked the friendly co operation of the companies with which the commission are dealing.

AMERICAN ELECTROCHEMICAL SOCIETY.—The New York Section of American Electrochemical Society will hold a joint meeting with the American Gas Institute and the Illuminating Engineering Society, on Tuesday, November 10th, at the Chemists Club, New York city, at 8 P.M.

The subject of the evening will be "Contributions of Chemistry to Illuminating Engineering." The speakers will be:

Wilton C. Whitaker, on "The Incandescent Gas Mantle."
William C. Moore, on "Chemistry in the Development and Operation of Flaming Arc Lamps."
Ralph E. Meyers, on "The New Tungsten Lamps."
R. D. Mailey, on "The Quartz Mercury Lamp."
D. MacFarland Moore, on "The New Moore Tubes.

There will be an informal dinner at the Club at 7 o'clock, preceeding the meeting, and the lectures will be demonstrated with many experiments.

INSTITUTE SECTIONS.—The just past meeting of the American Gas Institute, with the simultaneous technical sessions under the general divisions, Manufacturing, Distribution, Chemical, Accounting, and Illuminating, has shown the way to keep the annual meeting within three days, and still properly cover the ever increasing bulk of matter to be considered. Reports and papers have become so voluminous that even with the divided meetings it is necessary to read most of them by abstract, but as their value is preserved by the full printed text, this is an advantage. This section idea could well be extended to the Proceedings as published, putting all the sessions of each Section together in a subdivision of the complete volume.

WOULD EXEMPT PUBLIC SERVICE CORPORATIONS.—Exemption from local taxation of public service corporations was advocated lately by State Senator William J. Ogden, of Maryland, in an address in Baltimore.

Senator Ogden's subject was "The Relationship of Public Service Corporations to the People." He told his audience that the patrons of public service corporations—such as the users of gas and the travelers on street railways—pay, in the prices they are charged, the taxes of the corporation without receiving any benefit.

"The Gas Company," he said, "pays $360,000 a year in taxes. This means 10 cents on each 1,000 cubic feet of gas. If they were exempted from this tax they could lower the gas rate 10 cents, and they would make more money, for there would be a benefit to real estate owners and a consequent increase in the use of gas."

MR. CAVENAGH MARRIED.—Mr. Frank Cavenagh, of the American Meter Co., was married October 28, in Dorchester, Mass., to Miss Edith Wood Campbell, a daughter of Mr. and Mrs. Mark Poole Campbell. Mr. Campbell is of a very old New England family, and is a manufacturer of grand pianos. The wedding was in the Campbell homestead on Kenwood street, Dorchester, and was attended by friends and relatives from all the eastern cities. Following a reception, Mr. and Mrs. Cavenagh started on a trip that will cover the east and west, and finally take them to San Francisco where Mr. Cavenagh will be stationed for his company.

(*Continued from page 279.*)

open for. The men who are careless and risk the lives of other men; the faults of the superintendent; it makes no difference who or what it is that's wrong, we want to know all about it. We'll never get safety 'till we know who and what it is that makes the danger."

Some men look upon such action as tattling or "butting in," and I have known cases where men wanted to report matters of grave concern, but hesitated, anticipating that their report would not cause the remedy to be applied, and also fearing that exemplary discipline would be meted out to the offender. I am not a believer in anonymous communications, but in many cases the ends justify the means, and valuable reports or suggestions will be received if "Suggestion Boxes" are placed about the plant into which communications for the department inspection committee could be placed. Probably many communications would be anonymous, and perhaps some of an unpleasant nature. Opening these boxes at regular intervals by the workingman's committee would give a feeling of confidence that the suggestions would be given consideration, and, if found of value by the fellow workers, adopted. The timidity or backwardness of some of the men would be overcome by seeing their suggestions put into operation, their confidence in themselves strengthened and their interest in the work stimulated.

In practically every manufacturing plant "danger" signs are found, but a few days causes it to lose its effect. Transparent and illuminated signs, with the wording changed from time to time, will draw greater attention and will show that the "Boss" is watching these danger points—is thinking of the men. Why should they not think of themselves and of their fellows? Similarly illuminated signs at the entrance of the plants, bearing suggestive mottos, will assist, perhaps only a little, but nevertheless, some, in making men think.

In some plants the following notices have been used with advantage.

"Your wife and children expect you to be careful."

"When caution becomes a habit there will be fewer accidents."

"Better safe than sorry."

"Look out for the other fellow."

"Stop, look, listen."

"Your boss is paid to keep you from getting hurt—help him all you can."

In the gas works of the corporation by which the writer is employed, it was at first found somewhat difficult to make the men look upon safety devices with sufficient seriousness. They thought them a passing fad, and frequently when the repair of a piece of apparatus required the removal of a safety device, it was not replaced at once upon completion of repairs, possibly because the man in charge did not think, or because he did not care. After it was found that repremands did not accomplish the desired object, the superintendent made a rule requiring that immediately upon the discovery of unreplaced equipment the machine to which it belonged should be shut down until it was replaced. Actions spoke louder than words and to-day we have little or no trouble from this source. The men have been taught to think.

Not only must men think but they must be taught to apply their minds wholly to the task at hand. One writer on this subject has said:

"Concentration presupposes peace of mind. Common foes of this are the loan shark, domestic war and dissolute habits. These cause worries, worries distract, and distraction leaves a trail of the worst accident in their wake."

I have said the employer was the workman's best friend, and there are few manufacturing concerns that will not assist a worthy employee in times of financial stress. The average man does not get into debt because of any desire to do so. Too often sickness or death brings the first burden of this kind. In an effort to meet such an obligation the debtor prefers paying interest to being pressed for payment or feeling that his indebtedness places an unusual obligation upon him. He has no rich friends, no bank credit and the alluring advertisements or courteous letters of the loan agency meet his eye and ere he knows it he is in the hands of the loan shark. Just a little moral courage, and the help is at hand for worthy and deserving ones. Perhaps a good transparency to exhibit at times in the works would be: "If you have financial troubles tell them to the foreman."

The installment plan of credit is developing to such an extent that it will be, if it is not already, a menace to the peace of mind of many men and their employers. The evil of this system is so apparent to some managers of large eastern plants that vigorous measures are being taken to eradicate it; some even going so far as to set aside funds from which loans may be made to employees, re-payable in installments, where the loans are to be used for approved purposes. The temptations and allurements are so strong that many well-meaning men are in the meshes, and tied hand and foot before they are aware of their condition. And when the loss of what they have in part paid for, and the humiliation of being deprived of what they have purchased on "lease," stares them in the face, worry in many cases, practically destroys their usefulness and makes them easy prey to the dangers that beset them. Domestic worry destroys the peace of mind and cannot easily be thrown off. The trifling misunderstanding of life, the petty quarrels and the quickly spoken word that cuts and hurts, are not easily forgotten and are greater factors in diverting the mind of a man than is usually believed. True, these are matters that can hardly be handled by outsiders, but there are things that can quietly be brought to the attention of the men and their families and be of effect in this work.

"One thing at a time and that done well is a very good rule as many can tell,"

and—

"All work and no play makes Jack a dull boy,"

are true sayings, but work and play cannot be mixed with success to either. It is the duty of any man, both to himself and his employer to avoid "horse play" during working hours, that he use his play hours in the pleasures of life and keep the cobwebs from his brain, and so employ the rest hours that he may be physically fit for his task.

"There is a time for everything," is just as necessary in this work as to apply the rule "A place for everything and everything in its place." The playing of practical jokes, the hurry to "clean up" for the day of rest are enemies of the safety movement.

Quoting from an address delivered before the Efficiency Society of Rochester, N. Y.:

"Figures, covering 1,300 accidents, showed that Mondays and Saturdays were productive of a much higher percentage of accidents than other days of the week. The daily number of accidents, on an average, were found to be as follows: Monday, 253; Tuesday, 196; Wednesday, 194; Thursday, 197; Friday, 195; Saturday, 265.

"This was explained thus: On Mondays the workmen are not properly keyed up to their tasks; there may have been dissipation over Sunday. In other words their minds are not alert. On Saturdays the same conditions exist, except that the men are rushing their work, or their minds are on plans for the rest day."

These figures must impress anyone with the necessity of applying the mind to the task at hand and no other, whether the task be working, playing or resting.

The workman, the laboring man may forget work when he leaves the job, and not let it interfere with his play, but he should also learn to play properly, so that play hours do not incapicitate him for work—he should not dissipate. This is an axiom you say. Yes, but is it an axiom as to where pleasure and enjoyment ends, and disspation begins? Webster defines dissipation as "a dissolute course of life in which health, money, etc., are squandered in pursuit of pleasure; free indulgence in vices, as drinking, riotous living, etc." It must be conceded that the most dangerous vice is indulgence in intoxicating liquors, for it is the basis of all other vices, and this question must be met and dealt with.

Do not misunderstand the writer, he is neither a prohibitionist nor a total abstainer, but he does realize that a man with alcohol in his system cannot work to the highest point of efficiency, and is more liable to accident than if his system is free from its influence, especially if he operates machinery. As applied to the "Safety First" movement, this question is not a moral one but a business one, and sooner or later it must be handled. None of us would permit an intoxicated man to work around a gas works. But when does intoxication begin? Where is the line of demarcation between a sober man and an intoxicated one? No rule can define it for it differs with men, and the only safe rule is to prohibit the use of intoxicating liquors during business hours, including the lunch hour and going from the home to the job. The necessity for this is fast being recognized.

The United Natural Gas Company, of Franklin, Pa., has this rule:

"Everywhere the use of intoxicating liquors is being regarded with

increasing disfavor, and many large corporations have recently issued circulars to their employees on the subject. The habit, as we all know, greatly reduces a man's efficiency and makes him unreliable. A great many of our men are sober and industrious, and we desire that their influence be exerted to induce the drinking minority to follow their example. It has been decided that hereafter promotions will be made only from the ranks of the non-drinkers, and continuance of the drinking habit by employees will be cause for dismissal."

Another Eastern concern has the following rule:

"The use of intoxicants by employees while on duty is prohibited. Their use, or the frequenting of places where they are sold, is sufficient cause for dismissal. Employees are requested to report any fellow workman who is intoxicated while on duty."

Some manufacturers go even further and are waging vigorous campaigns against the locating of saloons in close proximity to industrial works, and in many places "Back with the Saloon" is almost as much of a slogan as "Get the Safety Habit."

The educational branch of this movement cannot be confined to the employees, it should be carried into all walks of life. Our public schools are teaching commercial salesmanship, why not commercial and industrial safety?

The Manager of the Department of Safety and Relief in one steel company, says:

"An effort is being made to carry this movement into the homes, schools and churches. At one plant a banquet was given to the clergy and a great deal of enthusiasm resulted. Moving picture shows of safety devices in the mills, and dangers of the street, have been given to thousands of children in the vicinity of the plants, and the results have been remarkable. Echoes of this effort have been heard through the children's fathers and brothers, who tell how they have been 'called upon the carpet' by the little ones and inquiry made as to their knowledge of safety rules, and whether they have a safety button, and as to the care they take to protect themselves and other workmen."

The foregoing is an effort on the writer's part to present the necessity of co-operation upon the part of the employee and employer in securing "Safety First," and some methods of accomplishing it. How about co operation among ourselves? These who are here today know that the organizations they represent are alive to this movement, and each is working in its plants to secure results. Why not have active co-operation among ourselves? Why not have this association take up the movement and push it along in all branches of our industry, carrying on the work every day of the year instead of discussing it only at our annual meeting? Why not organize for united and positive action by appointing a "Safety First" committee to handle the matter, and in the name of this association outline a plan of campaign covering the legal, mechanical and educational features of this movement and institute and push such campaign into every feature of the work?

Minneapolis Convention will Soon be Here.—November 30th to December 5th.

Although many of the details are still incomplete the general plan of the N. C. G. A. Convention, which is stirring the northwest with anticipation, has been definitely prepared. The Convention week has been for a year the chief concern of Mr. L. F. Blyer and other officials of the Minneapolis Gas Light Company. Realizing the twofold nature of the covention, that the delegates come for serious consideration of their problems, and to view all that is latest and best in gas consuming appliances, and, incidentally, to have some relaxation from the strain of the business sessions, the object has been to make every minute count. The Committees and the men who will present papers at the sessions have also been hard at work preparing for this big event.

Arrangements have been made to accommodate more than 1,500 delegates and counting those from nearby towns, it is expected that the attendance will reach 2,000. The general public will be invited to visit the exhibition, 70,000 invitations having been sent to Twin City householders by the Minneapolis Gas Light Company.

The entertainment features have not yet been fully decided upon, but the visiting ladies will be well taken care of by wives of the officials of the gas companies in Minneapolis and St. Paul.

The Hotel Appliance Men's dinner, inaugurated 2 years ago, will be repeated. Reservations for this should be made to Mr. C. D. Carter of the Minneapolis Gas Light Company as soon as possible. The exhibition and business sessions will be held in the National Guard Armory of Minneapolis, a building 165 feet by 200 feet, and the main floor will be devoted to exhibits. A gallery which extends around the Exhibition Hall will be used as a promenade and general view place, and will also be used for exhibition space.

Arrangements have been provided for 165 booths, the largest number ever used at any of the shows. A large parlor, beautifully appointed, will be provided for the convenience of attending ladies and a maid will be in constant attendance.

From the standpoint of originality the exhibits will surpass anything seen at past conventions. The educational exhibit will be a complete display of all the Association's educational activity up to the present. Interesting charts, photographs and figures will be shown.

The Publicity Committee will make a display of the best advertising done by gas companies, including newspaper advertisements, folders, stickers, car-signs, billboards, etc, etc. This committee will also hold a special session in the ballroom of the Radison Hotel, on Wednesday morning, December 2nd, to discuss the general subject of gas company publicity and advertising. All members interested are invited to attend this session.

A complete miniature gas works displayed by the Pittsburgh Coal Company will be in operation, actually manufacturing gas.

The Standard Oil Company will show a miniature oil field in operation.

The Harley-Davidson Motorcycle Company will exhibit motorcycles equipped to carry meters for hurry up service. The Wilcox Motor Company will show automobile trucks also equipped for carrying gas meters.

The Addressograph Company will install one of its latest automatic machines for the rapid addressing.

The Window Display Committee has made arrangements for a demonstration on the exhibition floor, where the most successful methods of trimming windows will be shown and explained. Booth No. 144 will be fitted up as a typical show window. Manufacturers will supply merchandise, and Messrs. Heiss and Alexander, of the committee, will demonstrate how merchandise should be arranged to show it to best advansage. Each day a change will be made in this exhibit using different goods.

The Remington Typewriter Company will render free stenographic service to all members of the Association.

In addition to the regular papers presented at the Convention there will be a large number of important committee reports. These have been prepared with the idea of showing the progress in gas and competitive fields in their bearing on the particular work of each committee, and of offering recommendations for meeting competition.

The Industrial Fuel Committee will hold several sessions in order that the members interested may have an opportunity to hear reading and discussion of papers dealing with the industrial fuel end of the business. The papers will be illustrated and the meetings have been arranged as follows:

Wednesday morning, December 2d..Convention Hall, Armory.
Wednesday afternoon, December 2d. Ballroom, Radisson Hotel.
Thursday, all day, December 3d.....Ballroom, Radisson Hotel.
Friday afternoon, December 4th.....Convention Hall, Armory.

The regular papers to be presented before the Convention sessions, subject to slight changes, are as follows:

"Direct Advertising as Applied to the Gas Business," by Alan R. Fernald.

"Accounting Paper," by A. P. Post.

"How to Secure All-Gas Kitchens in Old Houses," by H. K. Dodson.

"How to Select, Train and Hold Your Selling Force," by C. H. French.

"Securing and Retaining Residence Lighting," by W. A. Morris.

"House Maintenance Service," by Arthur Hewitt.

Mr. James J. Hill, of railroad fame, will deliver the address of welcome which will be responded to on behalf of the Association by Mr. Thomas N. McCarter, President of the Public Service Corporation of New Jersey. Mayor Wallace G. Nye, of Minneapolis, will also welcome the delegates.

The Convention and Exhibition give promise of being up to the high standard set in previous years, and every gas man who can possibly attend will profit largely, both by what he sees and hears, and from contact with the brightest minds in the commercial activites of the gas business.

A Transmission and Reflection Photometer for Small Areas.

[Prepared by P. J. Nutting and L. A. Jones for the Eight Annual Convention Illuminating Engineering Society.]

In many optical investigations it is desirable to measure the brightness of small areas—1 mm. square or less. The instrument here described was devised to measure the brightness of optical images, the local densities in photographic negatives, and the reflecting powers of different parts of photographic prints and other pictures. It has proved exceedingly convenient and precise, and so nearly all that may be hoped for in this type of photometer that a description may be of general interest.

The chief advantages secured in our instrument are the following:

1. The elimination of errors due to fluctuation in the comparison source by using the same source for comparison light and for the source of transmitted or reflected light.

2. The elimination of all corrections for shift of zero by providing easy means of balancing the two beams with an open system.

3. A direct view of the object sighted upon at all times during measurement. This is obtained by focusing an image of that object at the dividing line of the photometer cube.

4. An open linear scale, reading directly from zero to 100 per cent. provided by a rotating comparison beam and stationary sector. The photometer head used is, in fact, that of the Bechstein illuminometer. The ease and rapidity of setting provided by this form of variation of comparison beam are known to all who have used them.

A plan of the optical parts of the photometer as used for determining transmission, is shown in the accompanying figure.

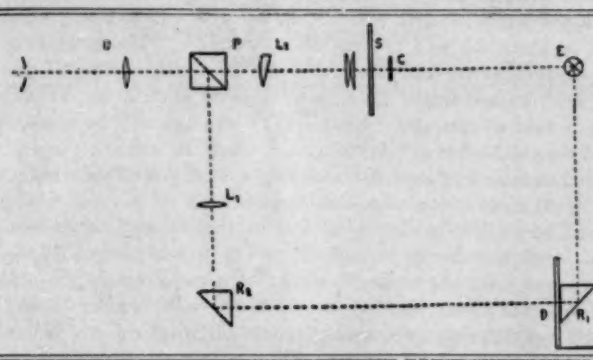


Fig. 1.—Plan of Optical Parts of the Photometer.

The source of light, E, is a condensed filament 100 watt tungsten lamp run on the lighting circuit. Light from this illuminates the comparison screen, C, of thin solid opal glass. This screen is viewed through the ocular O, the photometer cube, P, the rotating excentric lens, L_2, and stationary sector S. Light from E also passes to the photometer cube through the path ER_1R_2P. R_1 is a reflecting prism within a metal box mounted on a stand. The front face of this box is a plate of flashed opal glass, D, serving as a secondary source by diffusing the light. The plate whose transmission is to be determined is placed directly in front of this diffusing screen, thus eliminating errors due to scatter in the transmission measured. An image of the plate to be observed is thrown on the photometer cube, P, by means of the lens, L_1, and the reflecting prism R_2. These latter pieces are mounted on an arm carried by the instrument itself, the lens, L, being adjustable in position.

In use, the sector, S, is first set to read 100 and the source, E, moved toward or away from C until a balance is secured without the plate to be measured. The instrument will then read correctly from zero to 100 per cent.

For determining reflecting powers, R_1, and D are not used and R_2 is rotated to face downward (instead of horizontally as shown). The surface upon which observations are to be taken is placed directly under it on the table and the line L_1 focussed upon it. This surface is illuminated directly by the source E. Ordinarily, it is diffuse reflecting power that is desired, and the surface is placed horizontally—specularly reflected light not entering the instrument.

The zero adjustments for measuring reflecting powers are as simple as for measuring transmission. If only relative values are desired, as in measuring up a photographic print, clear paper is placed in the field, the sector set to read 100 per cent., and the source, E, adjusted to give a match at the cube.

If actual reflecting powers are desired, a mat surface, say a block of magnesium carbonate, whose reflecting powers has been determined on an absolute reflector, is placed in position, the sector, S, set to read its absolute reflecting power and the source, E, adjusted as before. The instrument will then give directly the diffuse reflecting power of any other surface placed in the field.

If the specular reflecting power is to be determined, total reflecting power is measured on the absolute instrument and diffuse reflecting power measured as just described.

The instrument, as a whole, is very easily, quickly and permanently adjustable; readings may be taken with it as rapidly and accurately as with any kind of visual photometer, and we have not yet detected any systematic errors in its readings. For months it has been in constant use by a number of observers in the sensitometry of photographic plates and papers. With a magnifying ocular it may even be used as a microphotometer of low power.

Bureau of Mines Directions for Resuscitation.

In line with its campaign to reduce deaths in mines the Federal Bureau of Mines some time ago appointed a committee of eminent physicians to develop an efficient method of resuscitation to be administered to workmen overcome by electric shock or by gases, in places which cannot be reached by a physician or surgeon immediately. As a result of their report, just made, Director Joseph A. Holmes, of the Bureau, recommends this procedure in rendering first aid to those in need of artificial respiration. The recommendations apply not only to those overcome by electric shock or gases in mines, but also to persons suffering from the effects of illuminating gas poisoning or from electric shock anywhere, and are, therefore, of importance to many thousands of workmen:

"In case of gas poisoning, remove victim at once from the gaseous atmosphere. Carry him quickly to fresh air and immediately give manual artificial respiration. Do not stop to loosen clothing. Every moment of delay is serious.

"In case of electric shock, break electric current immediately; free the patient from the current with a single quick motion, using any dry non-conductor, such as clothing, rope or board, to move patient or wire. Beware of using any metal or moist material. Meantime have every effort made to shut off current.

"Attend instantly to the victim's breathing. If he is not breathing he should be given manual artificial respiration at once. If he is breathing slowly and regularly, do not give artificial respiration, but let nature restore normal breathing unaided. If the patient is a victim of gas, give him pure oxygen, with manual artificial respiration. The oxygen may be given through a breathing bag from a cylinder having a reducing valve, with connecting tubes and face mask, and with an inspiratory and expiratory valve, the latter communicating directly with the atmosphere. No mechanical artificial resuscitating device should be used unless one operated by hand that has no suction effect on the lungs.

"Use the Schaefer or prone pressure method of artificial respiration. Begin at once. A moment's delay is serious. Continue the artificial respiration, if necessary, two hours or longer without interruption, or until natural breathing is restored. If natural breathing stops again, after it is restored, use artificial respiration again.

"Do not give the patient any liquid, until he is fully conscious. Give him fresh air and keep his body warm. Send for the nearest doctor as soon as the accident is discovered.

Special English Correspondence.

Communicated by Norton H. Humphrys.

Salisbury, England, October 15, 1914.

The General Position.—"Danger" of Gas.—Ferro-Concrete Construction Work.—Special War Legislation in Australia.

As regards the general position of the gas industry, there is little to add to my last month's letter. Coal and oil are still delivered in accordance with contracts, the only diffiulty being considerable delay in transit at times, due to the extra strain put upon the railways by military operations, such as the establishment of additional camps in various places. No further difficulty has occurred in the way of

obtaining supples of mantles and glass, and there is evidence that home manufacturers are rising to the occasion. In this connection there has been a great deal of unnecessary, and at times, undignified discussion. The objects of encouraging local and home, in preference to foreign trade, are so obvious that it is superfluous to bring in patriotic, much less vindictive motives. Trade jealousy on the part of England had no share in precipitating the present conflict, yet some of the utterances that have appeared in print might well support a different conclusion. In seaport towns, and naval and military centers, the gasworks are to some extent under military control. In one instance the visit of a "Junior Association" to a gas works was forbidden, on the ground that it was not advisable to admit a large body of strangers; and in these localities anything in the way of high power lighting, either for public thoroughfares or places of amusement, has been discouraged. The military authorities will not allow anything that casts a glow on the clouds, throws a distinguishing light out to sea, or enables public buildings to be localized from an air ship, with the result that many of our principal towns appear in semi-darkness, as compared with the modern applications of lighting to which they have been accustomed. I do not hear, however, that efforts in this directions have had any marked effect on the output of gas.

There are many stories of the gigantic gooseberry type in circulation, and amongst others, a paragraph has gone the round of the daily press, containing an intimation that gas companies are prepared to buy up ash from spoiled or spent incandescent mantles, in terms that have led to the idea that a small gold mine has been discovered. Much disappointment arises when it is explained that the total ash obtainable in an ordinary household using about 100 mantles per annum, is an insignificant item, perhaps a penny in a month. English gas companies have not taken up the manufacture of mantles or the preparation of thorinium nitrate, and therefore cannot go further than to act as collectors, and dispose of the ash to the mantle manufacturer as soon as a sufficent stock has been accumulated. The price they can obtain for the sifted ash, freed from all rings, broken support, etc., by passing through a mesh of 40 to 50 per square inch, is about 10/ per pound. Gas undertakings handling 20,000 mantles per annum and upwards have been accustomed to provide the inspectors with suitable receptacles for ash, and to dispose of it as fast as it accumulates, and the increasing use of mantles, covered with the present high prices of thorinium salts, will lead to an extension of this practice. The conservation of thorinium is the main object under the present circumstances, but the price of ash will have to rise very much higher before it will be worth while to collect it from the ordinary consumer, or to purchase it by the grain. Some of the Continental gas companies either exchange the ash for thorinium nitrate, or the equivalent in new mantles, or buy the knitted web, extract the thorinium from the ash and impregnate new mantles for themselves. But the necessary apparatus is so costly that it would not pay to adopt it for dealing with less than a million mantles per annum.

A story of a similar character was circulated some time ago by a magazine devoted to motor car matters. The continually increasing price of petrol has led to a keen interest in possible substitutes, and the editor, observing that one of the metropolitan gas companies manufactured benzol and other tar derivatives, jumped to the conclusion that all gas companies did the same, with the result that managers of little country gas works, using perhaps 1,000 tons of coal a year, were requested to quote for the supply of that liquid in large quantities.

The British Fire Prevention Committee have issued a number of useful rules, ostensibly for the use of hospitals, convalescent homes, and such like structures of a temporary character, as are now being provided in thousands throughout the country; but their suggestions might also be studied with advantage, and applied in the average household under ordinary circumstances. Familiarity breeds contempt, and we often find gas being used with such a degree of recklessness as to amount to a temptation of providence. As regards the use of gas, electric igniters or tapers are preferable to matches, and the lighting should be entrusted to one reliable person only, in each ward or department. If matches must be used, care should be taken as regards the disposal of the used matches. They should not be thrown on the floor after extinguishing, nor should boxes of matches be left within the reach of children or irresponsible persons. Preference should always be given to matches which only strike on the box. All gas burners should be protected by enclosure in globes or wire guards. Pendant lights require stout fastenings and shields (ceiling protectors), and swing brackets should not be used. (A note might have been made here about the old pattern stuffing box or water seal slide-pendant.) Gas cookers should be kept scrupulously clean and stood away from draughts, not on a wood floor, but on stone or metal trays preferably having an upright rim. India rubber tubing for connections should not be used. Most gas inspectors could tell stories as to the reckless neglect of one or more of these useful rules which have been advertised as constituting a "danger" connected with the use of gas.

The earliest types of gas works had buildings either of brick or stone, or to a large extent of timber. The wooden roof retort house is now a thing of the past, although timber holds its own in other parts of the works. But the gradual advance of steel and concrete has displaced these materials to a large extent. The latest development is the steel frame building and re-inforced concrete erection. Ferro-concrete is considered the most suitable material for gasholder tanks, and it offers the advantage of utilizing the large quantity of burnt brick and fireclay from the retort house, which is continually produced, and often has to be given away to get rid of it. If the material is crushed by passing through a breaking machine, and sorted by screening, it will yield large stuff suitable for foundations, buttresses, retaining walls, etc, ½" stuff for re inforced or ferro-concrete, and small, less than ¼", is an excellent substitute for sand. The Manchester Junior Gas Association were therefore fortunate when they succeeded in persuading Mr. Noble Twelvetrees to give an illustrated lecture on the subject, dealing with it from the practical point of view of one who is actually responsible for carrying out the work. Concrete is now so generally used that many gas engineers have acquired quite an experience with it, but others find that building extensions do not often come their way and that the exigencies of modern gas works management do not leave much leisure for following up the excellent literature that has now grown round the subject. To members of this class the information given by Mr. Twelvetrees is especially valuable. It was pointed out that a monolith structure, tied and cross-tied throughout till it resembled one solid block, possesses many advantages over buildings that contain several jointings, and in part depend upon the force of gravity to hold them together. One point not mentioned in the lecture is the comparative lightness so compared with a masonry structure of equal size and strength, which greatly economizes foundations. In fairly good ground a one story shed for purifiers, exhausters, governors, meter, machinery, etc., can be carried on piers 3 feet square, spaced 15 to 20 feet apart, and the intervening space is clear for pipes, connections, etc. The re inforced concrete buildings, if entirely closed, are less impervious to outside changes of temperature than any other kind, and if properly constructed are absolutely weatherproof. Mr. Twelvetree's lecture is the more acceptable because the use of ferro concrete is beset with traps for the unwary or ignorant, and want of necessary supervision, even in respect to apparently insignificant detail, may ruin the whole job.

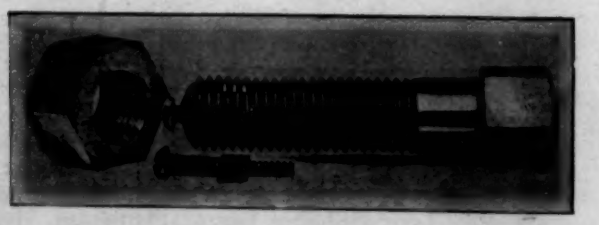
No special legislation affecting our industry has been found necessary on account of the war, and in fact it is under such strict control as to quality of supply, maximum price, raising of capital, rates of dividends payable, to say nothing of the general restrictions due to the Factory Acts, River Pollution, the Alkali Acts, Employers Liability, and many others, that it is difficult to see where any further control, short of absolute confiscation, could come in. The number of official returns required, as it is, makes a serious draft on the labors of the manager and his clerical staff. But the Australian Parliament, immediately on the outbreak of the war, passed a "Necessary Commodities Control Act," to continue in operation during the war, or for such further time, not exceeding 6 months after the declaration of peace, as the Government may determine by Proclamation. Gas as used for lighting, cooking, or any other purpose is included among the necessary commodities defined by the Act, and it is a testimony to the importance of the gas industry that it should be officially recognized as such. The Government may, by notice in the Government Gazette from time to time, declare and fix the maximum price at which any commodity may be sold for consumption; and any person selling, or offering for sale any necessary commodity at a higher price than the declared maximum, shall be liable to a penalty not exceeding £100. A commission, consisting of three members, was appointed on the 25th of August, in accordance with the terms of the Act, to inquire as to the prices of necessary commodities. The three commissioners have a somewhat large order and need a more than average capacity for hard work and grasp of technical detail. In dealing with gas, they would require to take special evidence in

respect to each undertaking throughout the country, for it is obvious that circumstances differ so widely that a maximum, applied to all alike, must have such a wide margin as to be of little practical value. Many would already be selling below it, and rather a nice question would arise as to obligations for selling below the maximum.

One or two gas works are experiencing difficulty in meeting the increasing demand for gas as the days draw in, with the raw, weak, and inexperienced labor that is the only substitute obtainable for the large proportion of especially skilled men that have been called to the colors. The retort house is the chief difficulty. In some cases 50 or 60 per cent. of the total strength has been depleted in a few weeks, and the substitutes have never seen a retort or a furnace before. In some cases there has been no hesitation in taking full advantage of the opportunity afforded by the scarcity of labor, and as a consequence one result of the present situation will be a great impetus to the introduction of retort handling machinery, conveyors for solid material and labor saving devices of all classes.

New Methods and Appliances.

A Recently Developed Nut Lock.—This nut lock employs the broken thread principle, the construction is simple and it will lock automatically, with a slight turn. The nut lock consists of three parts, a spring, a movable section and a set screw. There are four broached places in the nut for locking it on the bolt. The movable portion of the lock is inserted in a hole in the bolt, and the threads upon it are normally kept out of alignment by the spring. When it is desired to lock the nut the threads on both portions must be in alignment. If this is not the case, the set screw is turned to compress the spring and bring the threads in line after which the nut is turned until it is over the movable portion of the thread on the bolt. The set screw is then turned until the pressure on the spring is relieved and the threads are thrown out of alignment, after which the



screw is removed to prevent tampering with it. If the nut should not be absolutely locked in position at the time the set screw is taken out, it is emphasized that any vibration to which the nut might be subjected would tend to lock it in position, for if the nut moves it will only turn a short way before one of the broached places comes over the movable portion of the bolt. If through inadvertence the set screw is not removed, the nut, it is claimed, cannot come off under the influence of vibration, as the set screw probably would be jarred loose and fall out before anything happened to the nut, while any movement of the latter would only result in its locking. One special point is that none of the locking parts are exposed to the elements, being completely covered by the nut.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,114,021. Gas Burner. F. H. Oehlke, Lorain, O., assignor to The Hoffman Heater Co., same place.

1,114,043. Gas Pressure Regulator. J. R. Ricketts, Los Angeles, Cal., assignor to Perfection Gas Regulator Co., same place.

1,124,045. Treatment of Coal Tar or its Products for the Removal of the Properties therein Tending to Induce Pitch Cancer. H. W. Robinson, Sedgley, England.

1,114,065. Coking Process. L. L. Summers, Chicago, Ills.

1,114,072. Gas Producer. A. von Kerpely, Vienna, Austra-Hungary.

1,114,308. Bunsen Burner. L. J. Strause and O. Spahr, Philadelphia, Pa., assignor to Strause Gas Iron Co., same place.

1,114,355. Gas Producer. J. H. Hirt, Sewickley, Pa., assignor by mesne assignments, to Allis-Chalmers Co.

1,114,504. Burner. G. E. Moen, Missoula, Mont.

Items of Interest
FROM VARIOUS LOCALITIES.

The International Gas and Electric Company, of Philadelphia, has completed and put into operation another plant in its Southern territory—the Gaston County Gas Company, of Gastonia, N. C. This is one of the most up-to-the-minute water gas plants in the South, built by the United Gas Improvement Company and the Cruse-Kemper Company. Gastonia is in the heart of the South's rapidly developing textile industry, Gaston County having more cotton mills within its borders than any other county in the United States, and shows every promise of being a most successful company. This is the fifth company in this section now operated by the International Gas and Electric Company—the others being at Concord, Goldsboro, and New Bern, N. C., and Georgetown, S. C."

An exhibit showing the quantity of ash from 200 pounds of Elkhorn-Laclede coke and from the same weight of hard coal has been installed in the Olive street windows of the Laclede Gas Company in St. Louis. The exhibit includes a furnace with a section cut out, indicating the proper way to feed a fire with coke. The exhibit shows that while 200 pounds of hard coal seems less than the same amount of coke, the ash from the coal weighs 29½ pounds, while the ash from the coke weighs 11½ pounds. In dollars and cents the exhibitor has figured the ash loss from hard coal at $1.22 a ton, and from coke at 33 cents a ton.

A correspondent on Long Island sends this: The Sag Harbor Gas Company, to whose President, Henry F. Cook. the village of Southampton has granted a new franchise, complains that the Southampton Electric Company has opposed and delayed the carrying out of the original contract expiring a few days ago. The new franchise requires that the gas system shall be installed within 8 months from January 1, and that at least 3 miles shall be completed, and gas furnished to consumers 18 months from date. The illuminating gas will be made at Sag Harbor, and piped 10 miles to Southampton. The officers of the gas company say that despite obstacles and delays the people of Southampton will have gas in the main business and residential section of the village late in 1915.

Messrs. Forstall & Robinson were engaged some time ago by Richmond, Va., officials to go over the municipal gas plant and make recommendations for its improvement. They have finished their work and made a report, covering improvements to supply the demands of the city for the next 20 years. They give Superintendent Knowles much credit for the splendid management of a plant which is very old, and state that no plant in the country, built more than two years ago, can compare with it. The report recommends an increase in the capacity of the coal gas plant to reduce the price of gas; the use of through horizontal instead of the present stop-end retorts, at a cost of $51,500; the development of a market for coke; the installation of a carrier system, locomotive crane and elevated coke bins with crusher and screens; purchase of land west of gas works and east of Elm street for the development of the works, which, with the carrier system, will cost $62,000; improvements this year in the plant for holders and changes amounting to $73,000; extension of the distribution system into the suburbs, including the towns of Barton Heights, Ginter Park and Highland Park, and improvements on the south side of the James River.

The business of the Amarillo (Tex.) Gas Company is increasing fast, and will average perhaps 15 per cent. larger than last year. They are installing a new standard United Gas Improvement water gas set, Mr. J. F. Seeber being in charge of the installation.

The New Britain (Conn.) Gas Light Company is putting in a larger main on Myrtle street, from the Corbin Screw Corporation to Curtiss street. This section has grown so rapidly that a larger main was necessary to supply the increased business.

The resolution authorizing the Kalamazoo, Mich., city officials to request the Kalamazoo Gas Company to open its books to the expert secured by the council to make the analysis of gas production and distribution costs has been passed by the council. Chairman Early of the Engineering Committee presented the resolution, which was considered a week ago at a meeting of the committee of the whole and passed by a unanimous vote of the council.

THIRTY men have been added in the past few weeks to the force employed by the Scranton (Pa.) Gas and Water Company in installing ranges and other gas appliances. "It has been tha best season we have ever had," Manager E. M. Stack is quoted as saying. "We had to increase our force to fill the orders in anything like a reasonable time after they were given. We are now caught up and expect to keep apace of the biggest Fall business we have ever had in our gas department."

THE Mayor of Alton, Ills., has a scheme for a Public Arbitration Board, which he promises to launch in the near future to settle differenceces between the corporations in the city of Alton and citizens. His idea is to appoint a committee from city officials who will investigate the complaints of citizens. If the scheme is carried to perfection it will work along this order: Mr. A has a grievance against the Alton Gas and Electric Company about his light bill; he goes to the complaint department of the company, and if he does not get satisfaction he takes the matter up with the city officials who investigate complaints, and if they find it just they will take the matter up with the company for settlement. The mayor is of the opinion that with such a board the feeling between the corporations and the citizens generally will be much better.

THE Consumers Gas Company Employees' Association, Reading, Pa., held their monthly meeting on Thursday evening and were entertained with a talk by Superintecdent John H. Keppelman on municipal ownership as he saw it in Europe. These officers were elected: President, William Naile; Vice-President, F. M. Guldin; Secretary, E. L. Scott.

THE New Bedford Gas and Edison Light Company is to furnish the Marconi wireless station at Marion, Mass., with power for its entire plant, and is at present engaged in building a high tension line to Wareham, where the line will connect with a similar one being put up by the Plymouth Telephone and Telegraph Company. It will then feed back to the station at Marion.

PETITIONS are being circulated in Richmond, Cal., by citizens who have organized to protest against the maintenance of what they assert is an exorbitant gas rate compared with that of other cities of the State. The petitions are addressed to the City Council, and are designed to induce the City Attorney to summarize the gas rate situation, and go before the State Railroad Commission, to seek relief. Richmond is paying $1.25 per 1,000 cubic feet.

A MOVEMENT has been begun in North Tonawanda, N. Y., for the establishment of a municipal gas plant. Seven petitions requesting the common council to call a special election for the purpose are being circulated. The petitions state the city is now in a controversy with the gas company; that the consumers think that the gas supply is inadequate and that the prices are exorbitant.

A PENNSYLVANIA charter has been granted to Edward Mandeville, of Philadelphia, for the Charlestown and Schuylkill Township Electric Company. This is a subsidiary company, it is understood, to the Philadelphia Suburban Gas and Electric Company, of West Chester and Phoenixville, which is building a trunk line between the two boroughs named.

C. L. BEEGLE was elected President of the York (Pa.) Gas Company Association at a meeting of the employees held in the gas company building, West Market street. The other officers are: Vice-President, James Overmiller; Secretary, Marion Pflieger; Treasurer, Wilson Sprenkle; Board of Governors, Norris Frick, John Weiser, William Reisinger and Charles Lyne.

THE United States Government has awarded the Key West Gas Company the contract for installing and supplying gas to the Key West Barracks. Manager S. P. Vecker says that the installation will include 22 Eclipse gas ranges in the officers' quarters, and one 3-oven Lang hot-blast mess range for the enlisted men. The installation will also include 22 Eclipse tank water heaters in the officers' quarters, and one automatic water heater in the men's lavatory. The Government decided to install gas at the Post after an exhaustive investigation on the economy of gas as a fuel, influenced by the fact that it was already used at the Navy Yard, at the Marine Barricks and in over 90 per cent. of the homes of Key West.

EVELETH, MINN., citizens are agitating for a gas plant, either privately or municipally owned. All agree that gas for lighting and cooking is very desirable and that a gas plant is a needed improvement for the city. An ordinance granting a franchise to a private corporation was given its first reading by the council some time ago, but never reached a vote.

MR. A. LOFTE, for 16 years foreman of the Eau Claire (Wis.) Gas Light Company has taken over the gas fixture stock of the Wisconsin-Minnesota Light and Power Company, and will do all of its supply and piping work under the firm name of "The Eau Claire Gas Supply Company." Headquarters have been established at 320 Gibson street, where the show room will be ready at the end of the week, after being thoroughly overhauled and renovated.

RESIDENTS of Wilson, N. C., are disappointed at the failure of the Southern Gas and Improvement Company in the matter of fulfilling their contract to begin work on the gas plant. A franchise was granted the company and bond given to the town, but at the last meeting the Board of Commissioners ordered the bonding company be notified of the failure of the company to comply with the conditions of the franchise. Wilson was promised a completed gas plant by Thanksgiving day, but nothing has been done so far. The company stated some time ago that they had purchased a site for the works and that work would begin soon after that time. In the meantime other towns are getting gas plants and Wilson is still without this modern convenience.

THE Chattanooga (Tenn.) Gas Company has formally applied to the Chickamauga and Chattanooga national military park commission for a license to lay an 8 inch wrought steel main along Hooker road, to connect with the plant of the Chattanooga Gas and Coal Products Company. The main will be 4½ miles long and will cost approximately $40,000. Manager S. E. DeFrese says he expects the main to be completed by the time the coke oven plant is ready for operation, about March 1. "We will take a minimum of 2,000,000 cubic feet of gas daily," says Mr. DeFrese, "and must sell it by encouraging the application of gas fuel for industrial purposes. We have engaged Mr. J. C. Rushin, of Havana, Cuba, and formerly manager of the commercial department of the Atlanta Gas Light Company, who will superintend our new industrial gas department. Mr. Rushin has had many years of experience in the use of gas for manufacturing purposes."

HOQUAIM, WASH., city commissioners have held up the application of L. H. Burnett and associates for a franchise. The matter will be taken up again under modified conditions.

How the Welsbach Company saved the gas lighting industry from a bad blow as the result of the war is told in a leaflet just issued. By two beld strokes the company has not only assured the American public plenty of gas mantles, but has gone so far as to reduce the price. Officers of the company, and particularly President Sidney Mason, feared war long before the public thought the nations of Europe would resort to arms. So he had his company prepare. The thorium ore found in Brazil formerly went to Germany to be reduced by a chemical reagent to nitrate, and was then shipped to this country. They saw that, in event of war, the trade would be annihilated, and planned far in advance to make the nitrate in this country. They gathered large quantities of thorium ore and stored it here. The second stroke of enterprise was on the night of July 23, when Austria sent its ultimatum to Servia. Realizing that a general European war was inevitable, and that no more chemicals could be obtained from Germany for some time, the officers of the company sent out an order to their purchasing agents to buy up all the reagent they could find. As a result, enough of it was bought within 24 hours to make mantles sufficient to last the nation a whole year. Thus, the market was saved and gas mantles made cheaper rather than dearer because of the war.

A COMMITTEE, consisting of Messrs. Streng, Montgomery and Lee, has been appointed by Manager McDonald, of the Louisville Gas and Electric Co., for the purpose of organizing a gas and electric club for employees of the company. The Commercial Department has been holding Saturday afternoon meetings for several months, and it is the intention to broaden the object of these meetings and make them of interest to every employee. The company's Safety First movement will be made a department of the club.

Utilities Commission News.

ONE OBJECTOR TO GAS COMPANIES CONSOLIDATING.—Approval of a consolidation agreement between the East Boston Gas Company and the Boston Consolidated Gas Company and sanction for an issue of $449,000 stock by the former concern, were asked at a hearing before the Massachusetts Gas and Electric Light Commission, and the only opposition came from Edwin F. Dwelley, of Lynn, who said he represented Boston gas consumers.

APPROVES FRANCHISES.—The up-State (New York) Commission has approved franchises granted by the town of Wheatland, Monroe county, to the Tri-County Natural Gas Company to extend its mains throughout that town. This approval will also carry with it the satisfaction of a complaint of the Town Board of Wheatland asking that the company be ordered to supply gas to the hamlet of Mumford. Mains for the hamlet of Mumford are included in the new franchises approved as are mains for the villages of Garbut and Scottsville, all of which extensions the company says it is now ready to make.

NOT A REASONABLE REQUIREMENT.—In the hearing of the complaint of residents of Marlboro, Mass., for a reduction in rates, before the Massachusetts Board of Gas and Electric Light Commissioners, the Marlboro-Hudson Gas Company complained that it was compelled by an order of the present administration of the city of Marlboro to pay for the re-filling of trenches by employees of the city of Marlboro, and that this extra expense was unnecessary as the gas company had filed a bond to protect the city against any damage that might result from faulty refilling on the part of the gas company employees. Gen. Morris Schaff of the commission, said: "I do not see where the city of Marlboro can, with good grace, come before the commission and ask for a reduction of the price of gas when such a condition exists. I do not wish to prejudice the case, but this is the first time that such a condition has been brought to my attention, and it should call forth public comment from the people of Marlboro. The gas company officials should protest against being refused a permit to open a trench on a street unless city men are put to work refilling the trench."

TAXATION OF UTILITIES.—Whether the present public utilities and other corporations that are now taxed on their gross earnings can sustain the burden of keeping the State government running without other means of State revenue being found, was discussed by the California State Controller before the Home Rule in Taxation League in San Francisco on September 23. Controller Chambers pointed out that the public utilities and other corporations are supplying sufficent revenue to the State under normal conditions, but as the corporation license tax, amounting annually to $800,000, will be lost by legislative enactment, and the poll tax, amounting to $850,000, may be eliminated when it comes to a vote of the people in November, other ways must be found for making up for this loss in revenue.

"If we are to stay with the present system of taxation, it is evident that new sources of revenue eventually must be provided to help out," said Controller Chambers. "The rates on the gross earnings of the public utility corporations justly can be put so high and no higher. As with the raising of levees, the sky cannot be made the limit. Much dissatisfaction now exists, also over the franchise tax on the ordinary corporations, principally because it cannot be made to apply to unincorporated business houses. All this means, obviously, that with the possible exception of another raise in public utility rates, we cannot look for an enlarged revenue under our present system except as the gross earnings of the public utilities may increase by natural growth and the number of other classes of corporations multiply"

According to the report of Joseph E. Davies, Commissioner of Corporations of the Department of Commerce, just issued, the corporations of California paid 76 per cent. of the State taxes in 1912, or $11,000,000 out of a total taxation of $14,863,000. In only two other states, Pennsylvania and New York, did the corporations pay more.

GAS PLANT AT WINSLOW, ARIZ.—The commission has authorized the Winslow Gas Company to issue first mortgage 7 per cent. gold bonds in the amount of $60,000, one-third thereof to run for a period of 5 years, one-third for a period of 10 years, and the remaiuing one-third for a period of 15 years. Tne bonds must be sold at a price that shall net the applicant not less than 80 cents on the dollar, the proceeds to be used in the erection of a gas plant and its distribution system.

A sufficient sinking fund must be created to retire the bonds when they fall due, but the sinking fund shall in no wise be regarded as a fixed charge but shall be paid from the rate of return, it being a portion of net earnings so set aside as a sinking fund instead of distributed as dividends to stockholders.

Financial Notes.

THE Consolidated Gas Company, New York, has reimbursed its treasury for the note maturities of Aug. 25 and Oct. 25, through the sale of new 8-month 6 per cent. notes. The amount maturing Aug. 25 was $5,000,000, the same total falling due on Oct. 25, making $10,000,000 in all. About 75 per cent. of these issues have been provided for by the sale of the new 6 per cent. notes, the balance having been paid from proceeds already in the treasury of the company. None of the new issue will be offered for public subscription, as the transaction is more in the form of a bank loan than an actual note issue. This takes care of all of the company's short term obligations for the present.

A MORTGAGE for $5,000,000 to secure a bond issue has been given to The Guaranty Trust Company of New York by The Twin States Gas and Electric Company, incorporated under the laws of Connecticut. The mortgage is given to secure funds with which to acquire the rights of The Hoosick Falls Water Power and Lighting Company and The Hoosick Falls Illuminating Company, and the properties of The St. Johnsbury Electric Company of St. Johnsbury, Vt.. and The Bennington Gaslight Company of Bennington, Vt. It is set forth in the mortgage that it is the intention of The Twin States Gas and Electric Company to make additions and improvements to the two plants at Hoosick Falls and the plants in Vermont, and also to take over and assume the bonded indebtedness and obligations of each of them. Under the terms of the mortgage the bond issue will mature on Oct. 1, 1953, and the amount received at the present time on the mortgage is $2,906,800.

THE Pacific Gas and Electric Company is continuing to make sales of the remainder of the $12,500,000 6 per cent. first preferred stock, of which about $8,750,000 has been taken up to the time subscriptions from stockholders closed. About $1,000,000 has been placed since that time and eventually it is expected that the company will dispose of the entire issue. Of the sales up to the close of subscriptions about $7,250,000 were to stockholders and approximately $1,500,000 was taken by employees and consumers of the company, and about 2,500 stockholders were added to the list from these two sources. Indications are that the earnings of the company will exceed the estimate made by the management at the opening of the year. Gross earnings for the 8 months ended August 31, 1914, compare as follows with the corresponding months of 1913:

Month.	Gr. Earn.	Inc.	Net Earn.	Inc.
August.....	$1,347,706	$97,971	$617,293	$158,702
July.....	1,350,323	140,730	613,185	212,734
June.....	1,379,438	128,249	644,711	171,419
May.....	1,368,892	58,127	646,156	94,653
April.....	1,398,722	72,989	692,193	91,751
March.....	1,405,652	40,774	668,174	65,702
February.....	1,442,538	95,242	734,413	131,220
January.....	1,592,747	145,332	812,389	176,485
Tl 8 months..	11,286,018	779,414	5,418,514	1,102,693

ANOTHER example of the earning power of public utility corporations, in spite of disturbed financial and mercantile conditions, is the report of the Old Colony Gas Company that earnings available for dividends for the quarter ending September 20, showed an increase of 41 per cent. over the same period in 1913. This provides an amount nearly sufficent to pay 6 months' dividends on the preferred stock.

AT a special meeting of the Fall River (Mass.) Gas Works Company on Nov. 3, the stockholders will be asked to authorize the Directors to withdraw their petition to the Gas and Electric Light Commission for authority to issue 2,700 additional shares. The Directors now wish to issue 3,622 shares at $190 each, the proceeds of which will be used to pay the company's floating debt.

THE San Diego (Cal.) Gas and Electric Company, operating about 600 miles of territory in San Diego County, has filed an application with the Railroad Commission to issue $500,000 face value of 6 per cent. debenture bonds to be used in discharging floating indebtedness.

THE regular quarterly dividend of $1.20 a share to holders of capital stock of the Washington (D. C.) Gas Light Company was declared at a meeting of the directors. Payment will be made November 1. This action on the part of the directors is proof of the sound condition of the company's business and finances in a time when securities are subject to fluctuations and depressions. The business is running on a record basis, according to a statement made by President Reeside. Nothing is being left undone, he says, that will increase the use of gas and contribute to the satisfaction of consumers.